

Introduction

Level I



Dr. Tarek Abdelhamid M.D.

VISIT...

LANZAROTE
Caliente.COM

تحذير هام

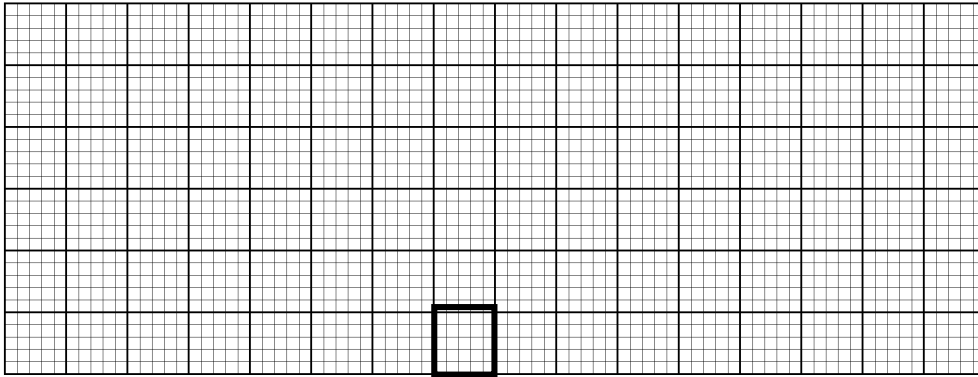
**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

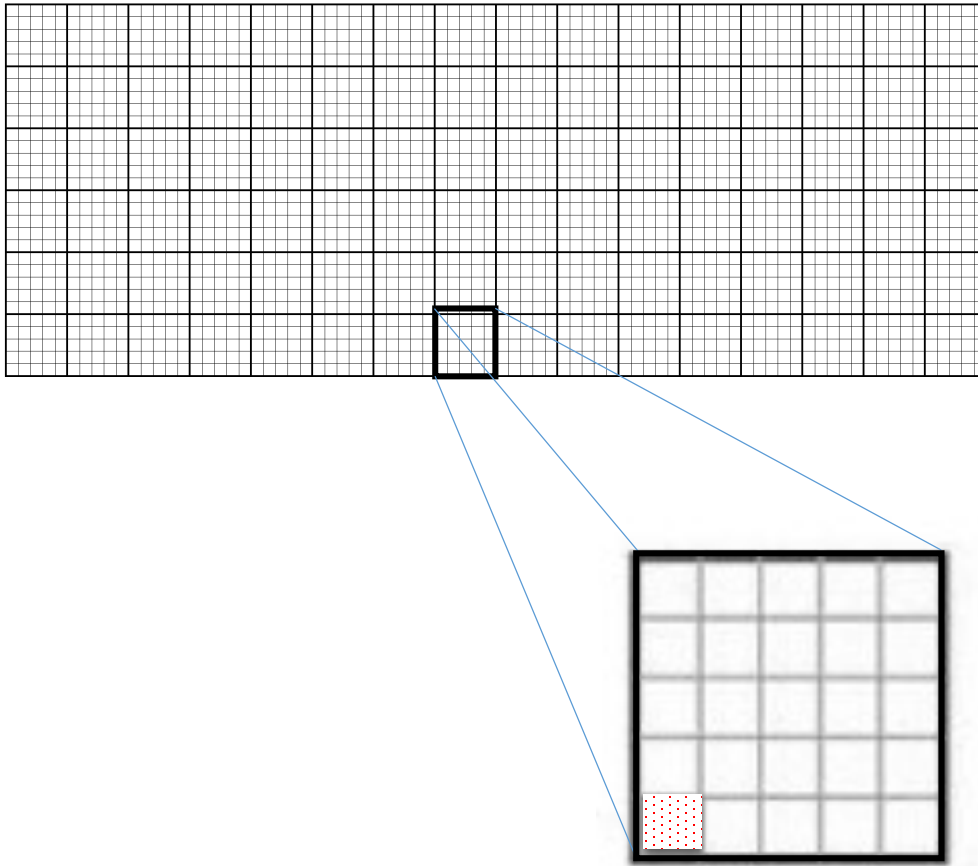
هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في هذا الموقع هم
تحت حماية قانون الملكية الفكرية و لا يحق لأحد إستخدامه أو إستنساخه أو
تحميله على أى كمبيوتر أو إعادة طبعه أو طبع أجزاء منه بدون إذن مسبق من
الدكتور طارق عبد الحميد (أو من ينوب عنه قانونياً) . و من يتعدى على
الملكية الفكرية المذكورة فسوف يتعرض للمسائلة القضائية عن جريمة إنتهاك
حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول
فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص برجاء
الإتصال بالدكتور طارق عبد الحميد



Introduction

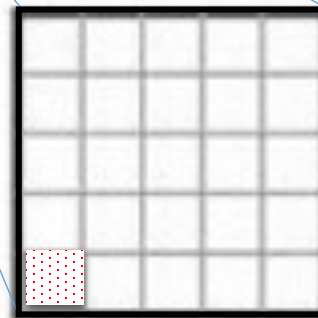
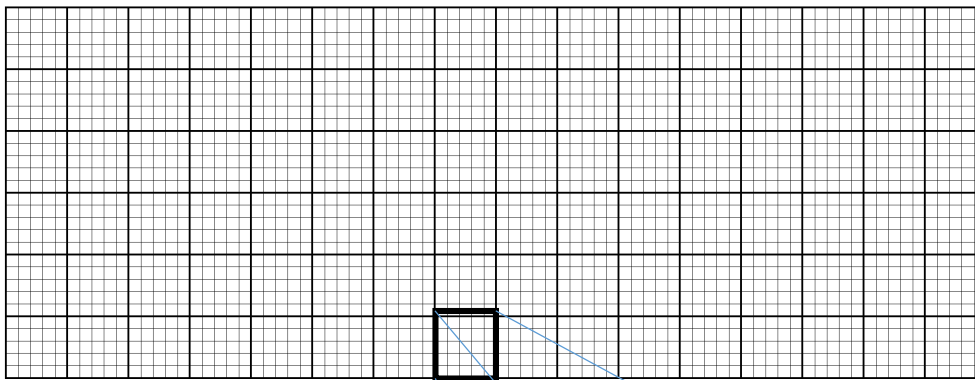






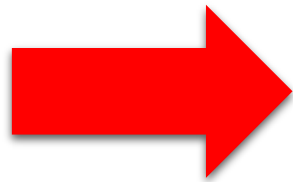
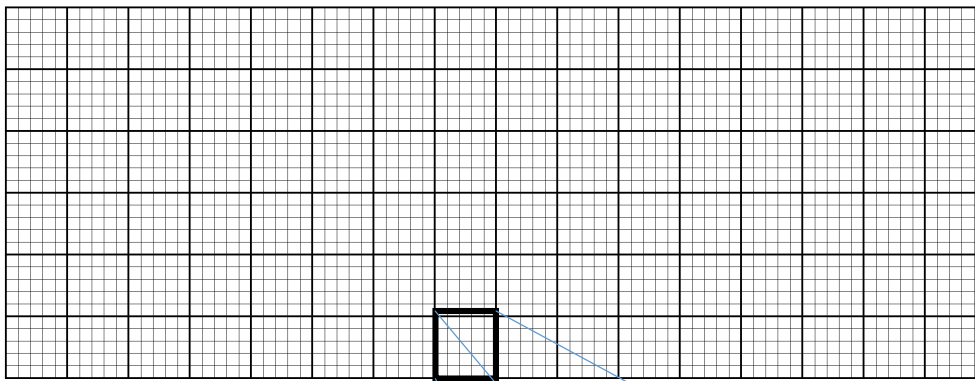


**Voltage
Amplitude**

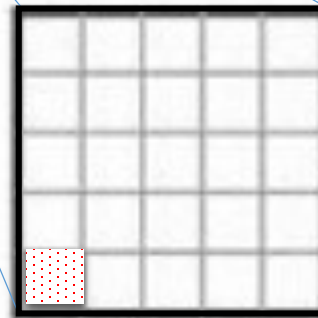




**Voltage
Amplitude**

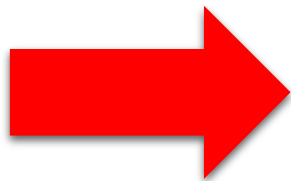
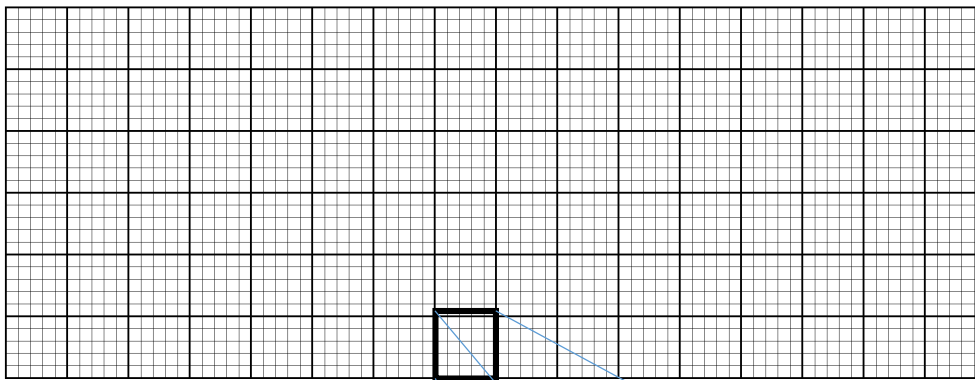


Duration



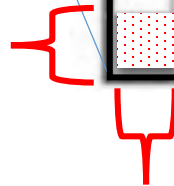


**Voltage
Amplitude**

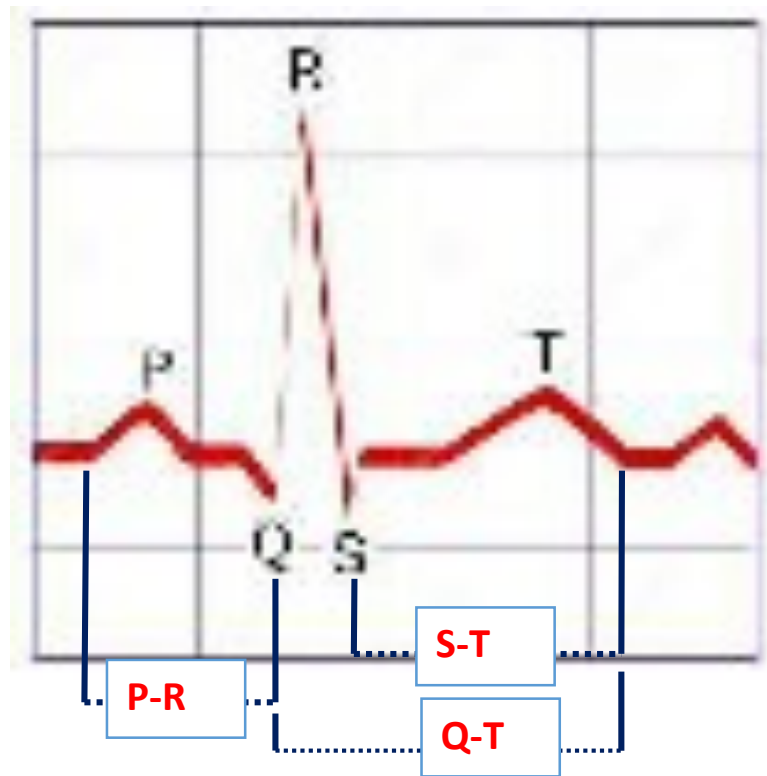
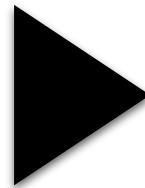
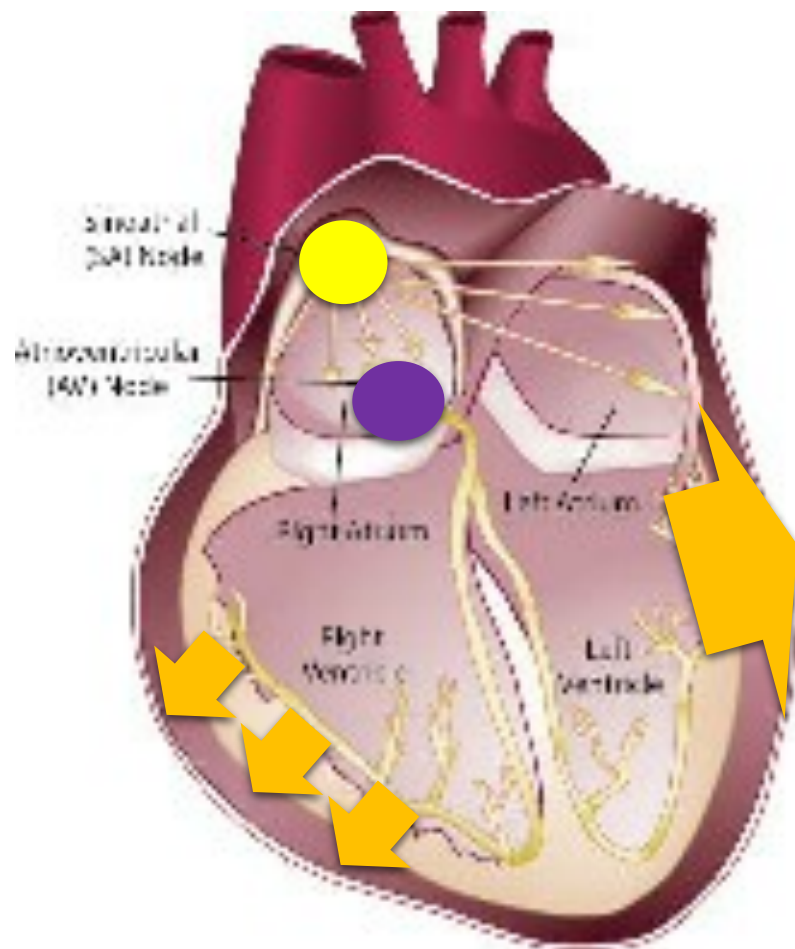


Duration

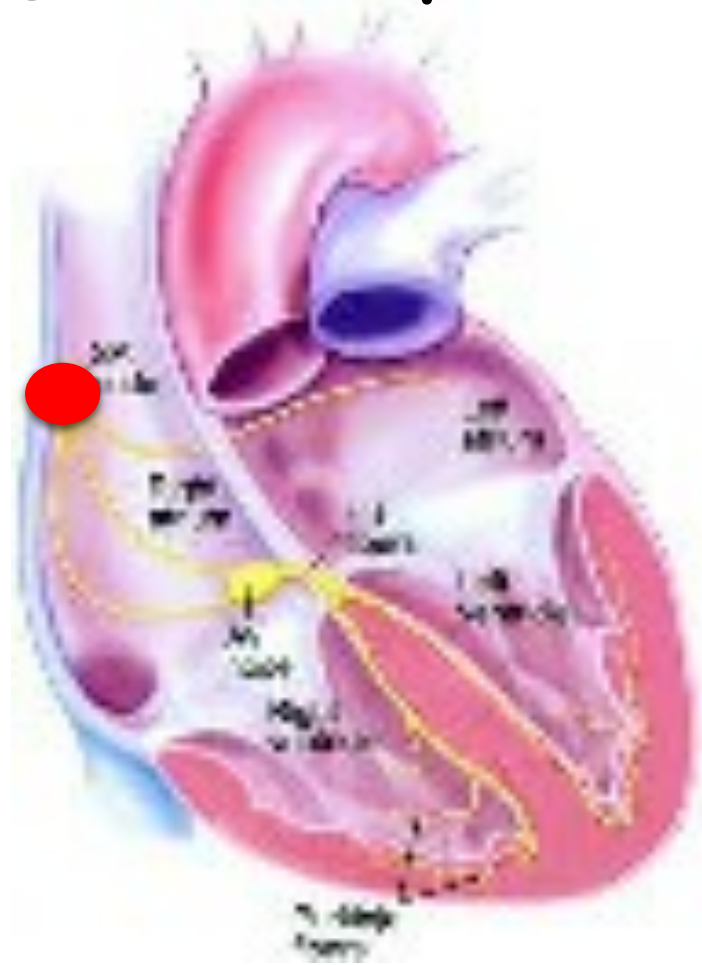
0.1mV



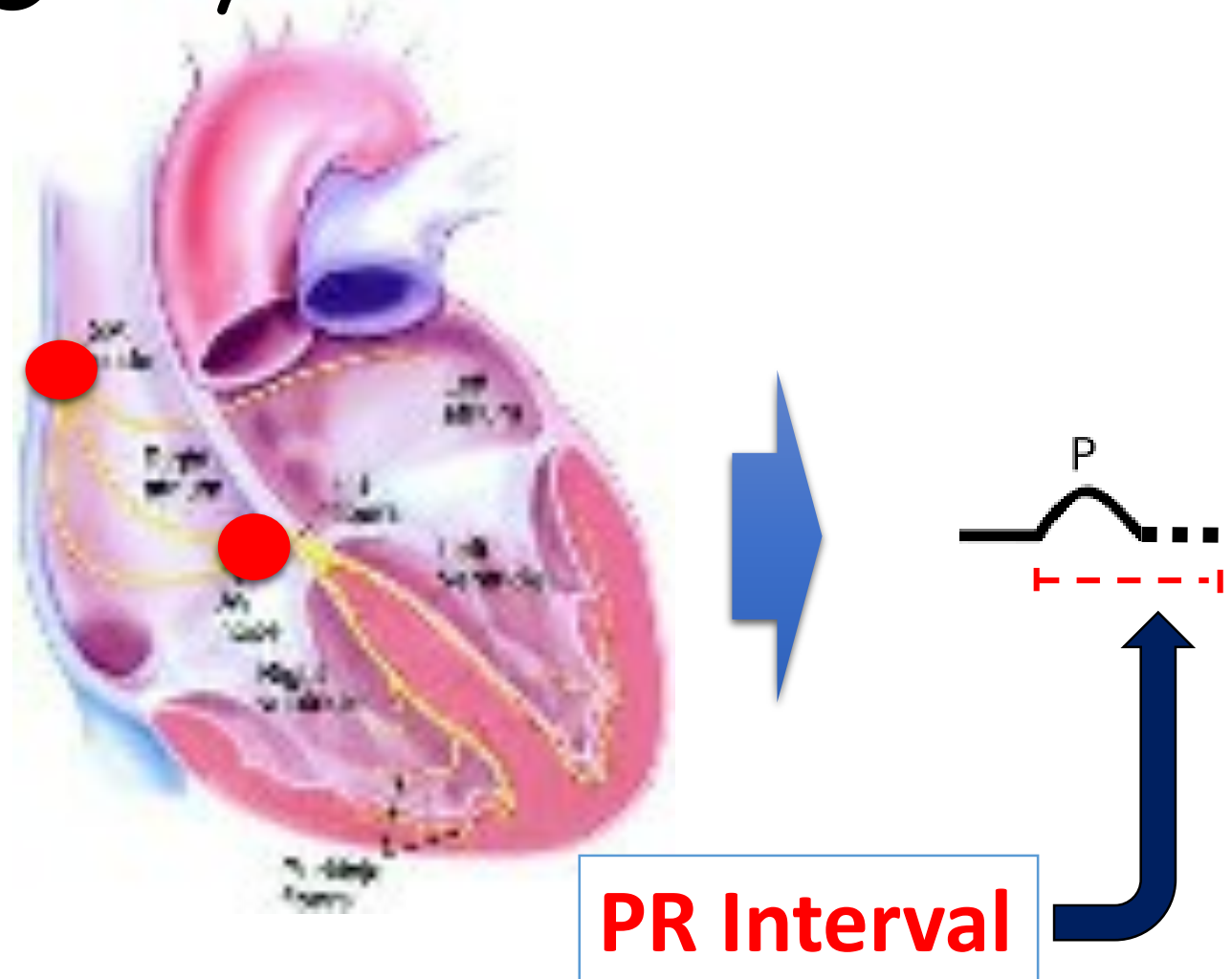
0.04 Sec



① Atrial Depolarization

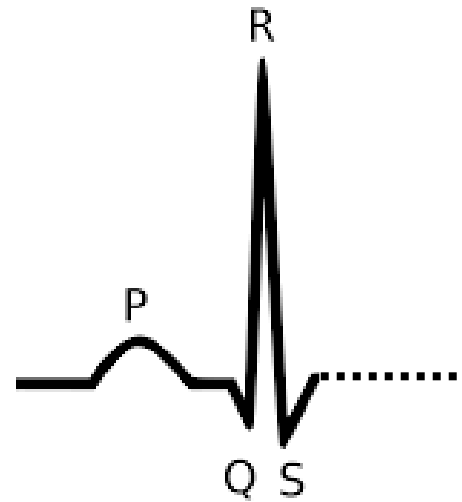
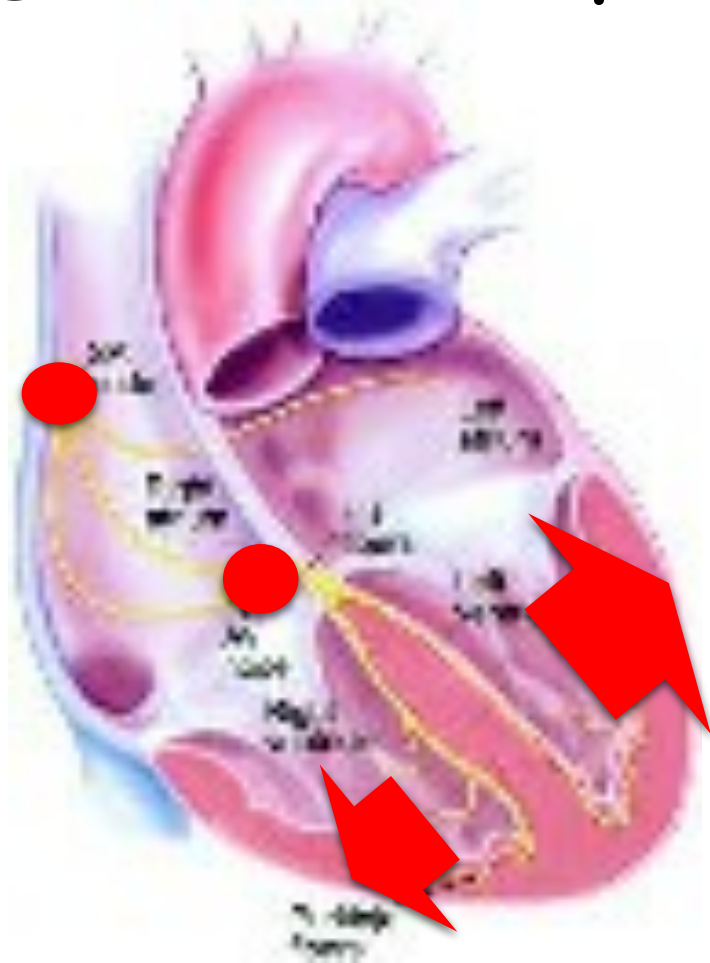


② Delay in AV Node



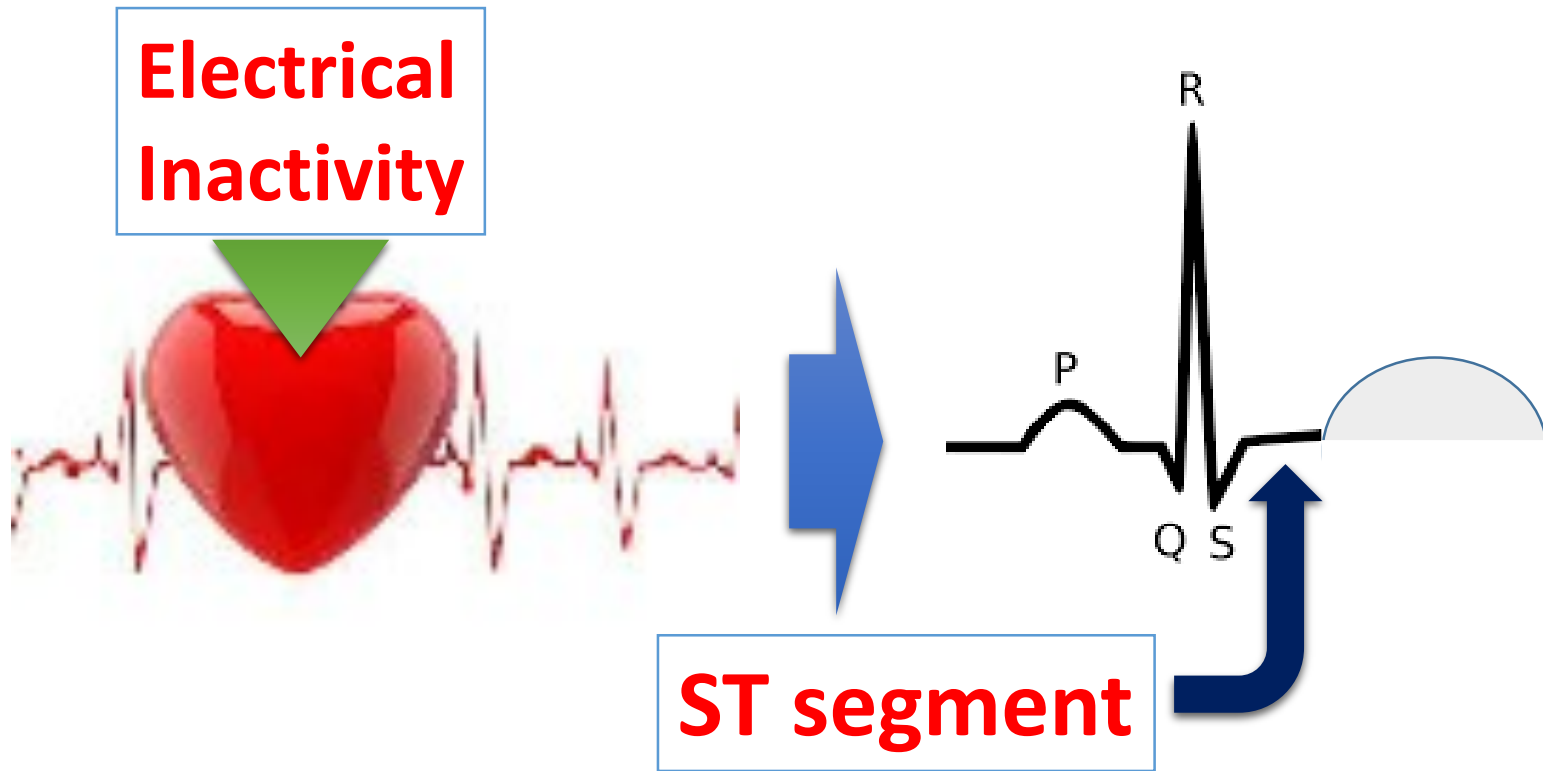
PR Interval

③ Ventricular Depolarization

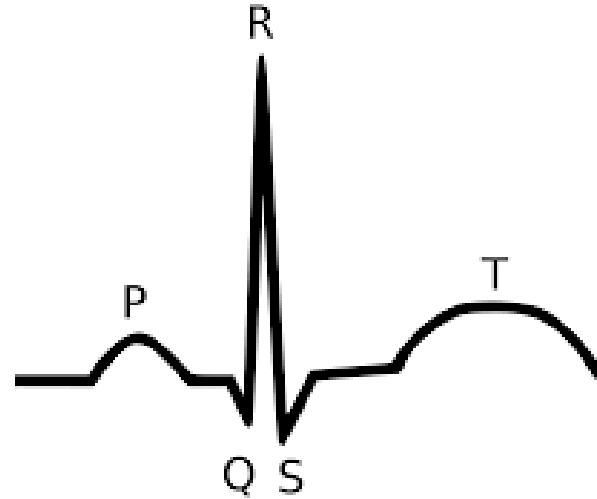
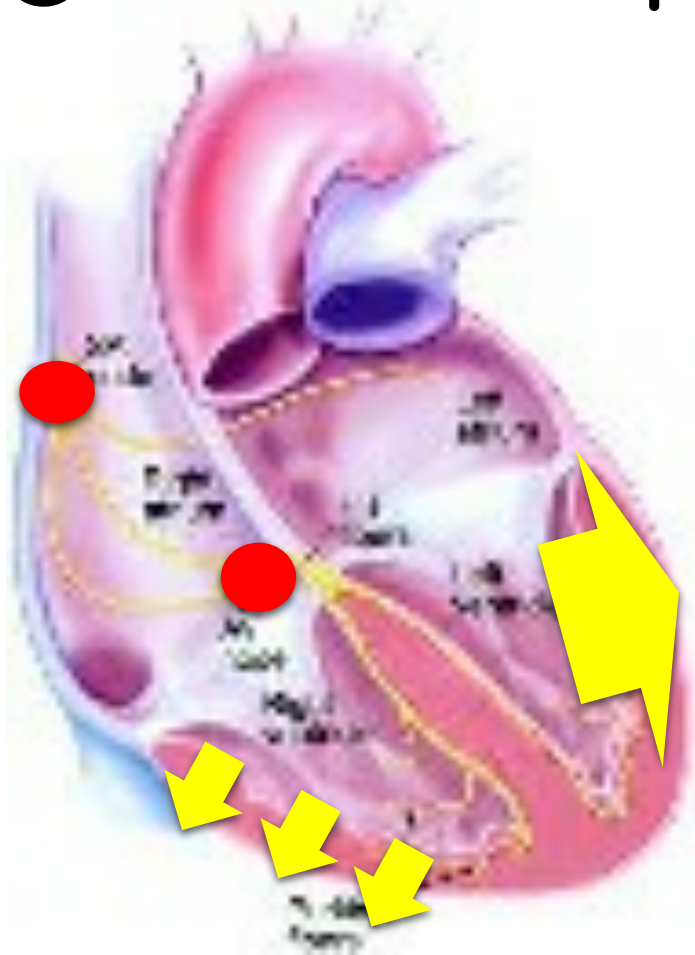


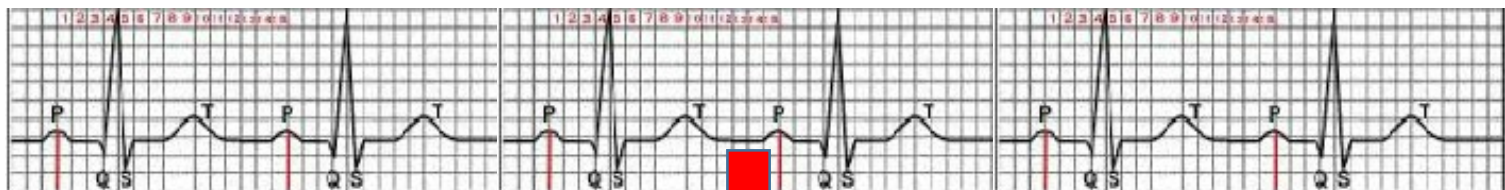
**QRS
complex**

4 Isoelectric period

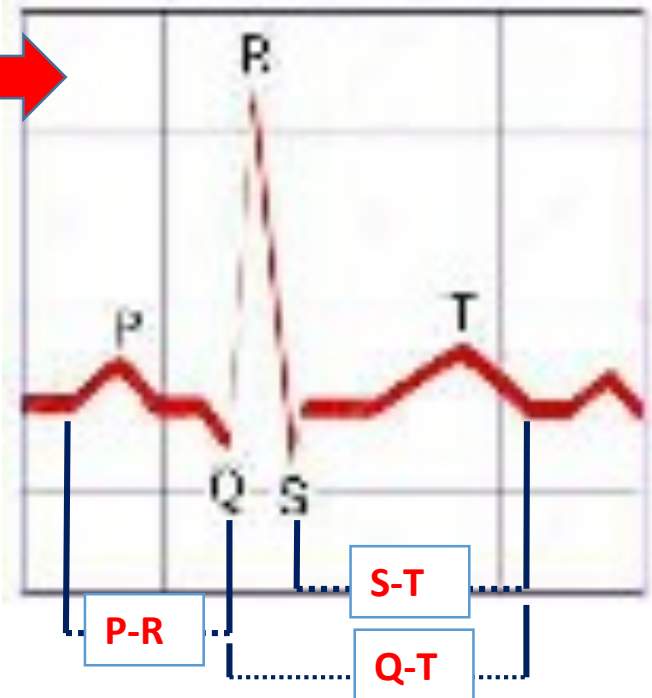


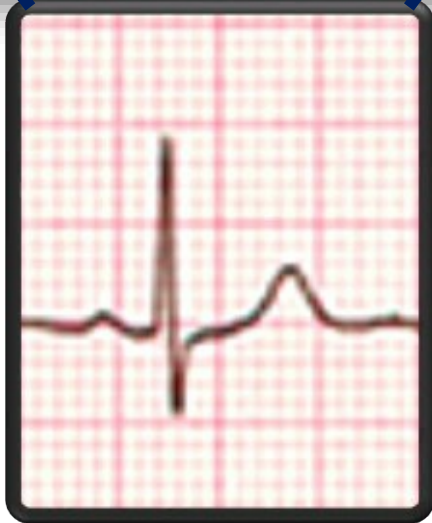
⑤ Ventricular Repolarization



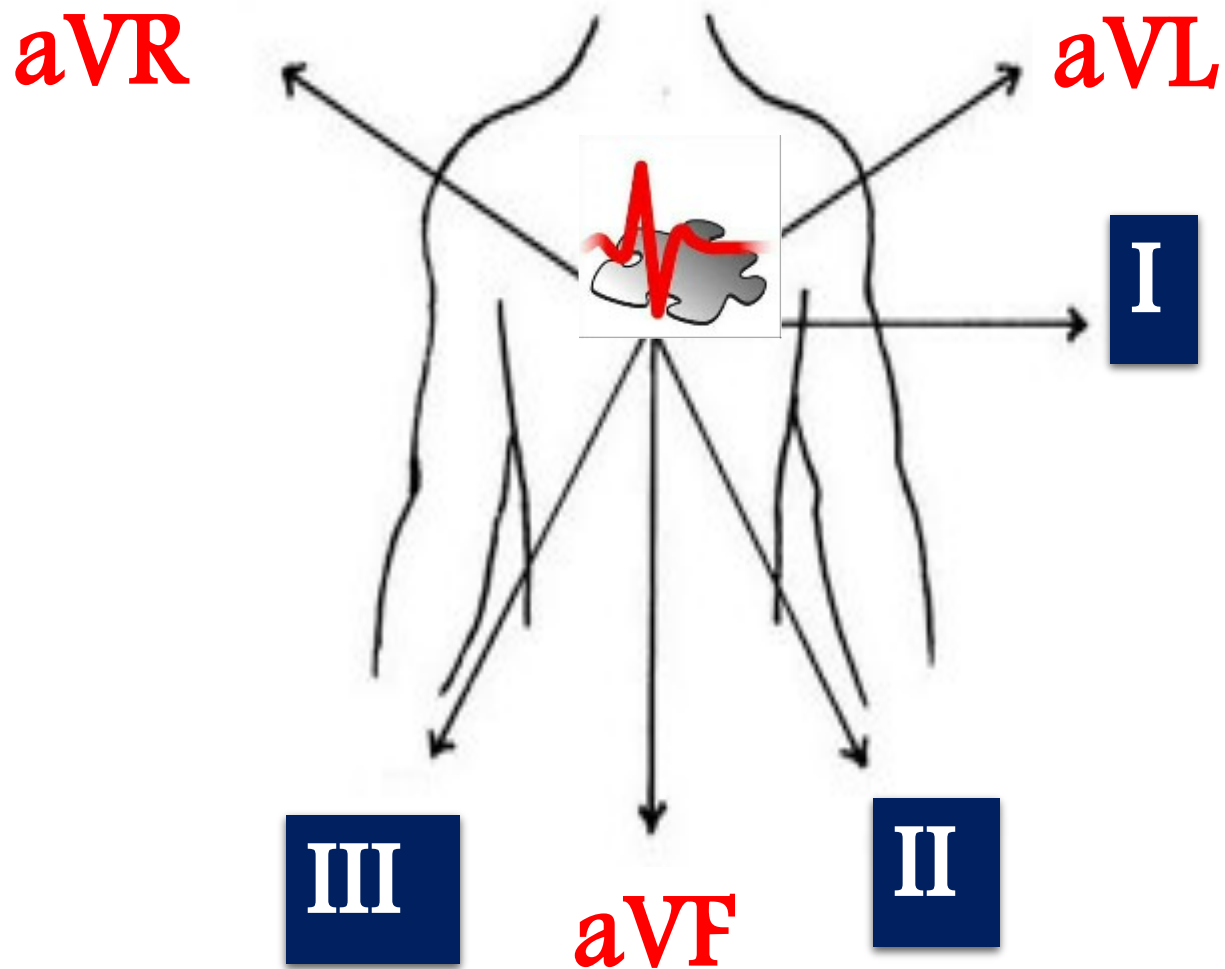


The Electrical System of the Heart

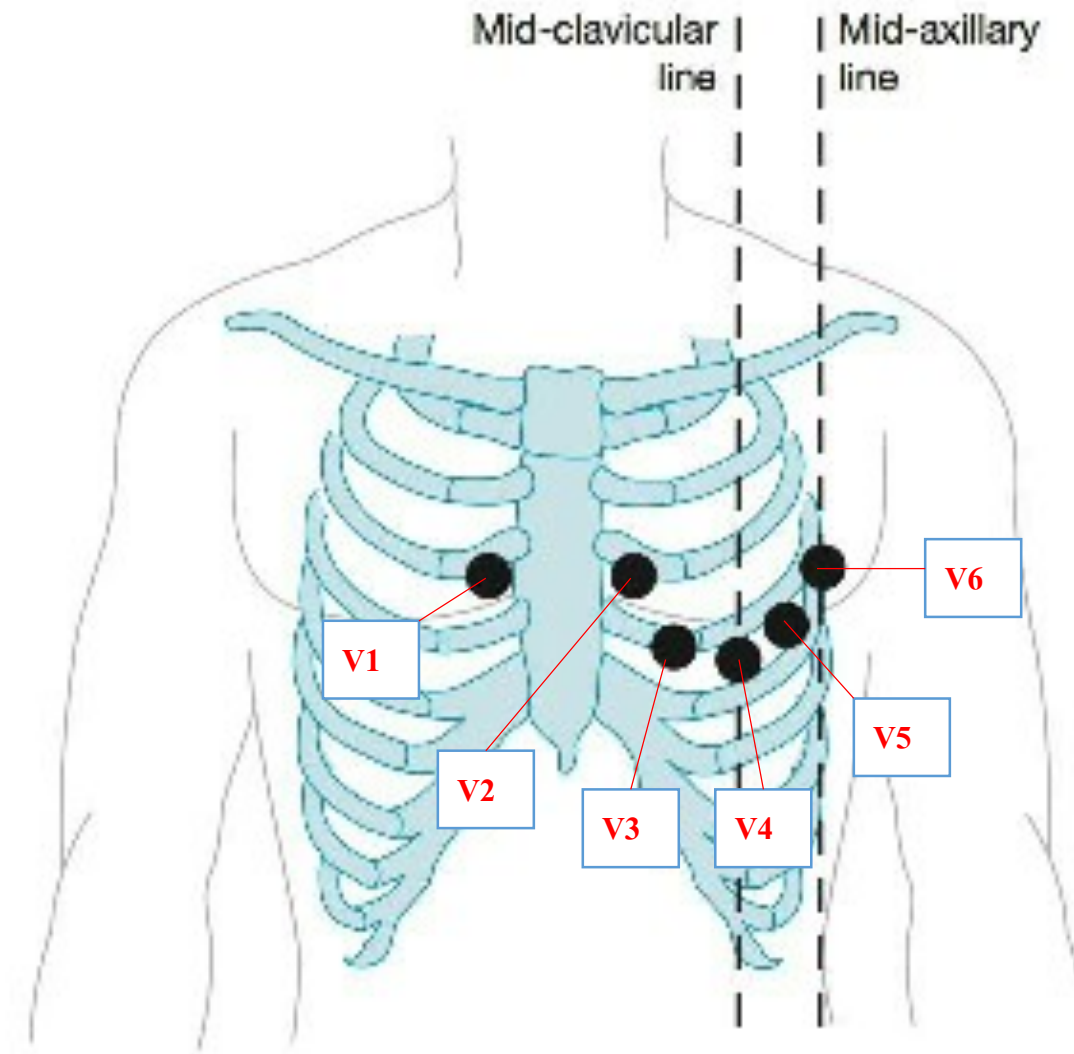




ECG Leads



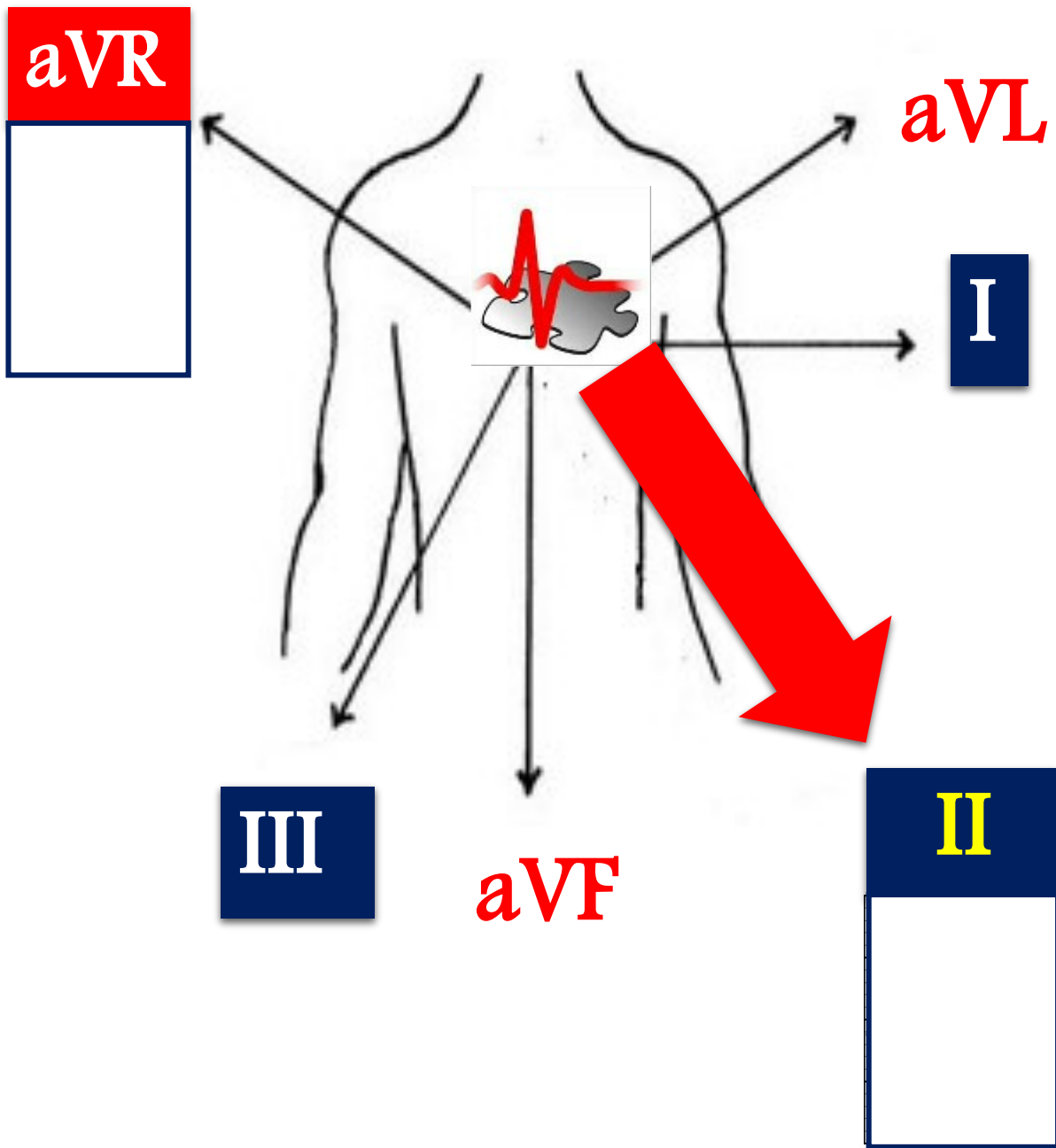
12 lead ECG: limb leads



12 lead ECG: Chest leads

Golden Rule of the ECG





aVR



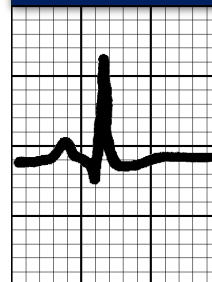
aVL

I

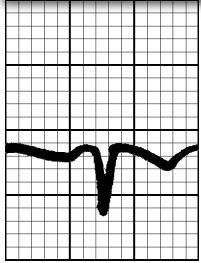
III

aVF

II



aVR

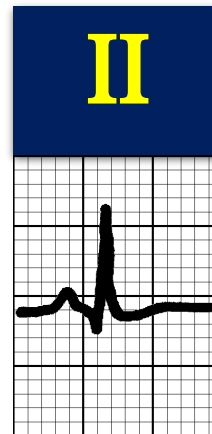


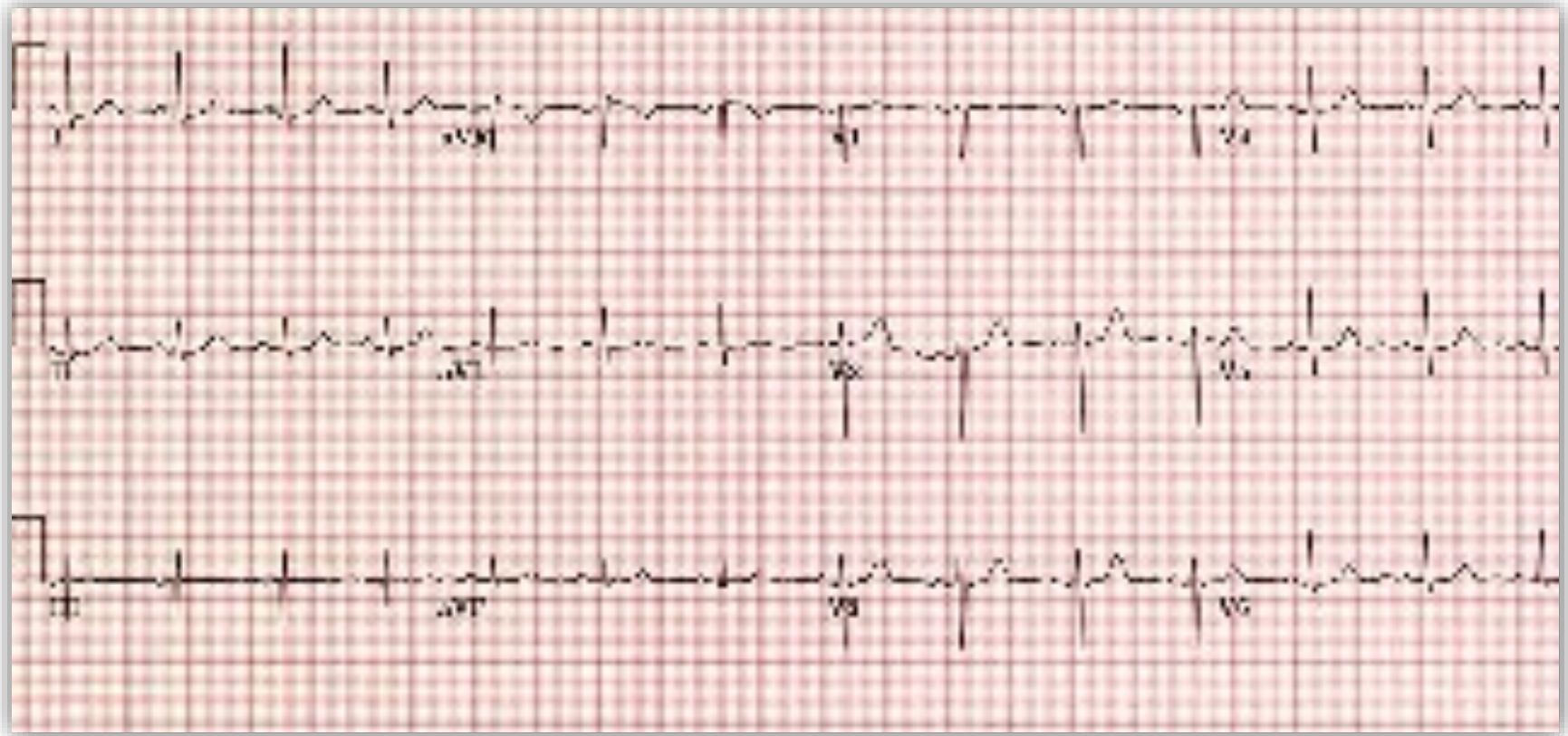
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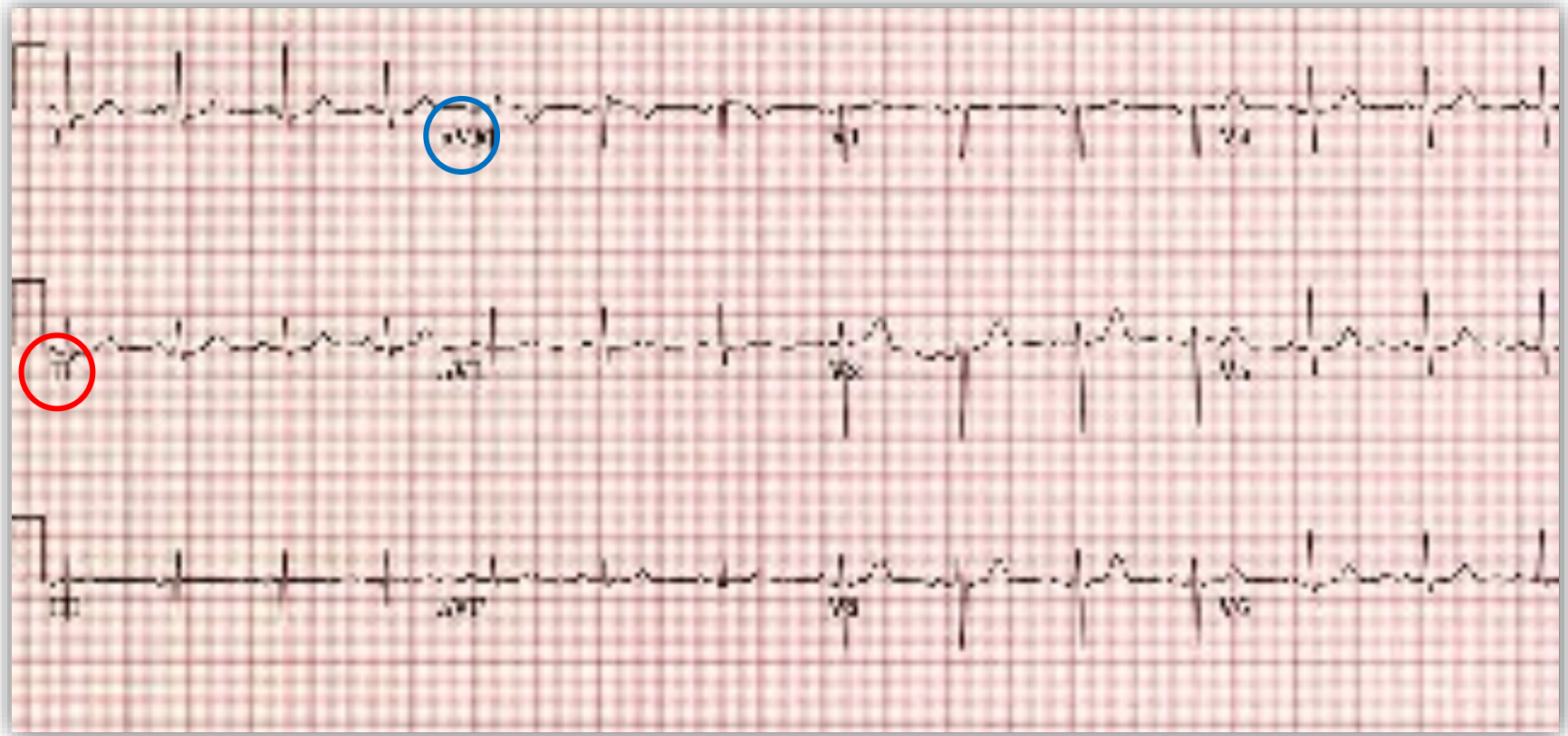
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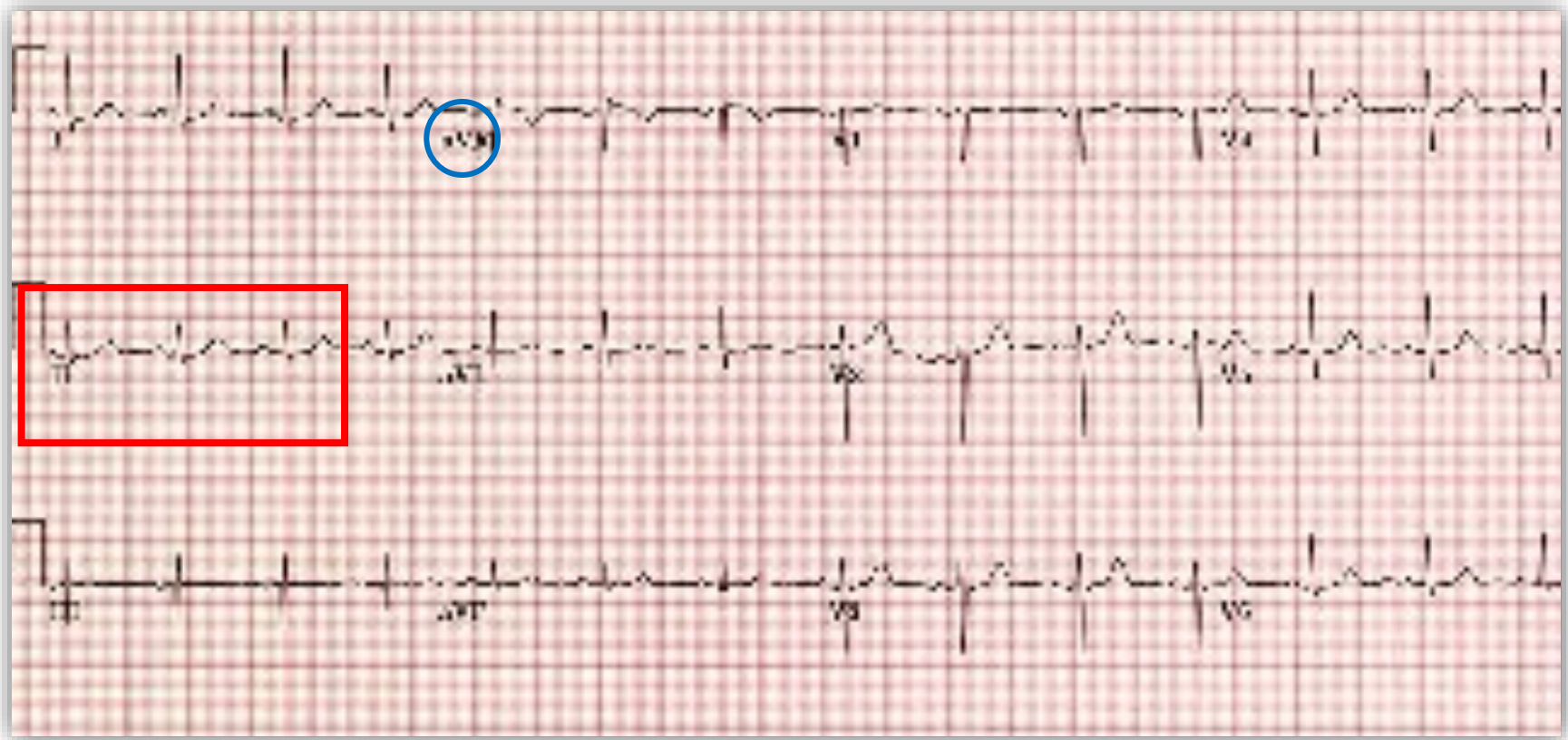
III

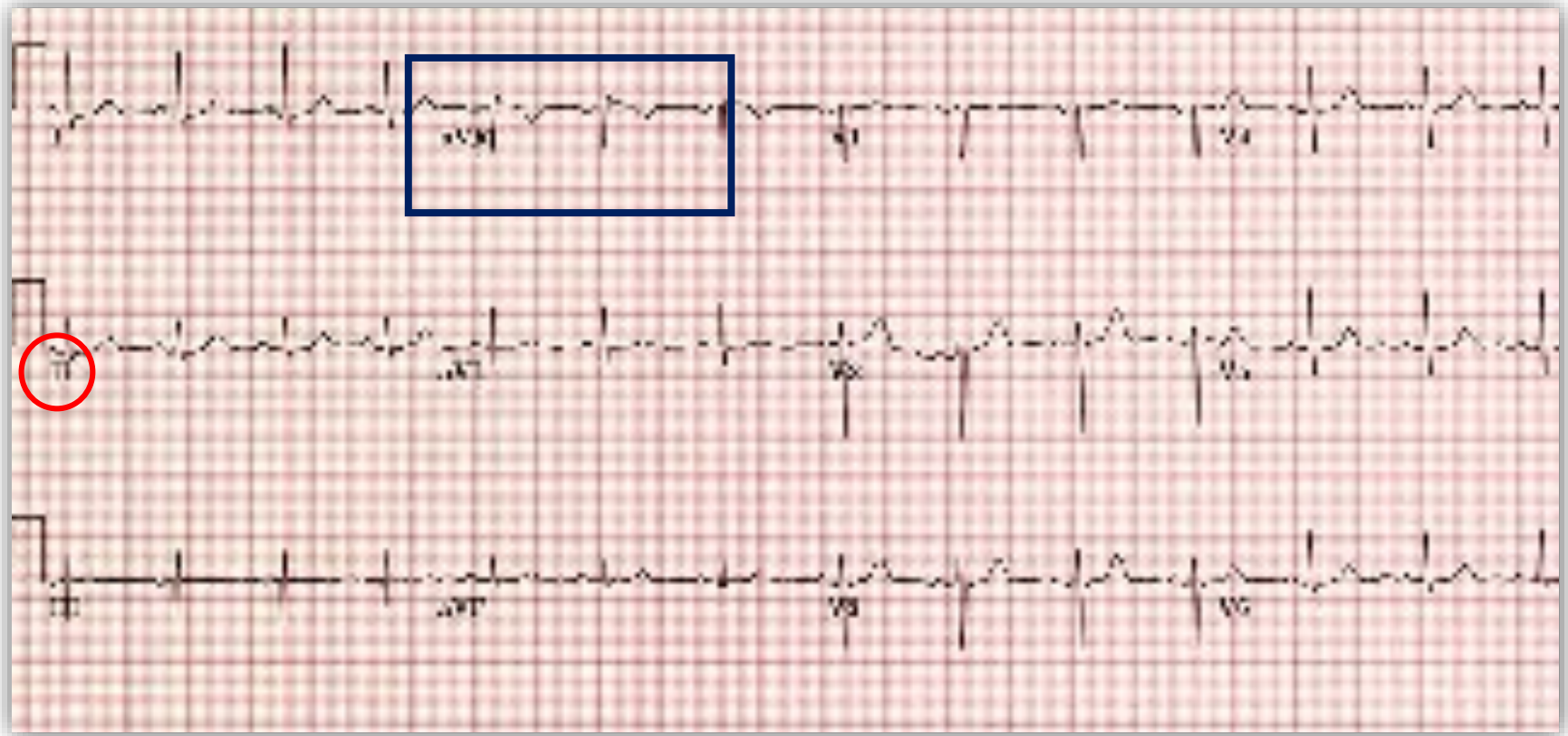
aVF

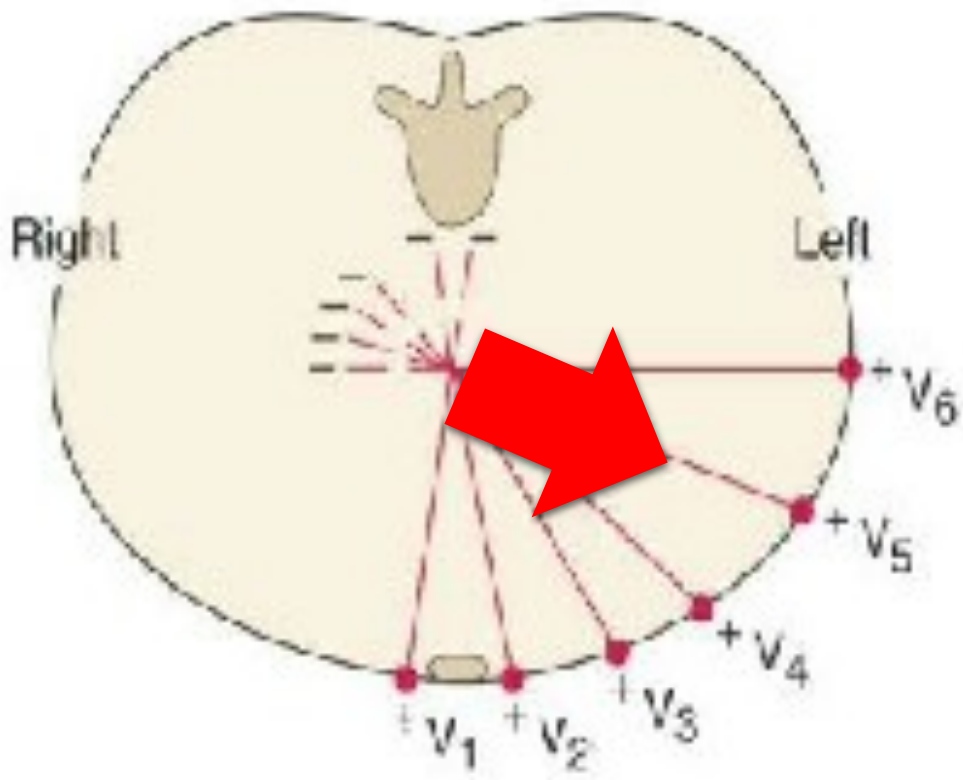




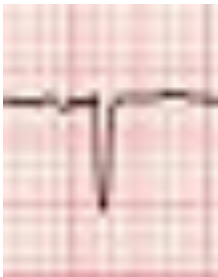




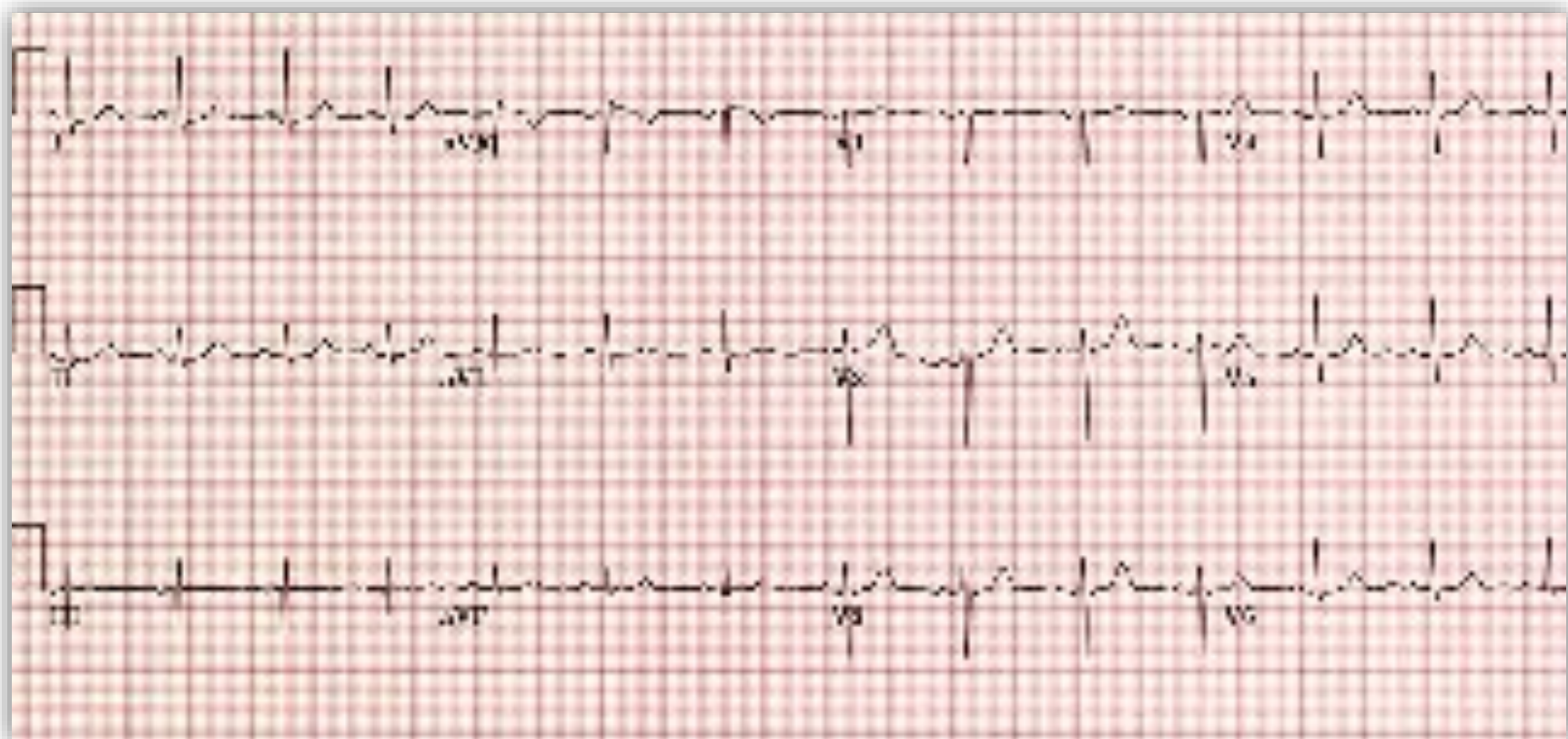


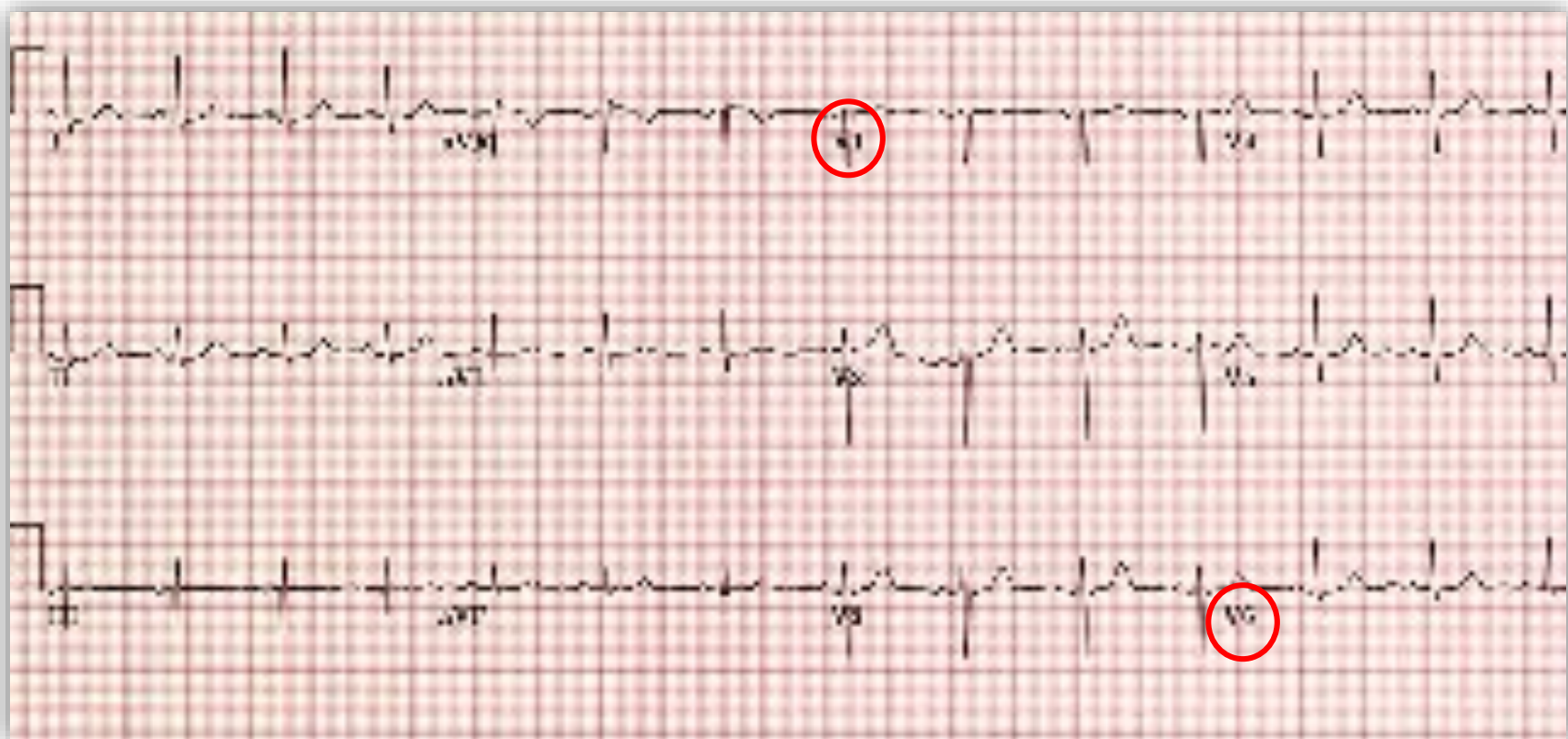


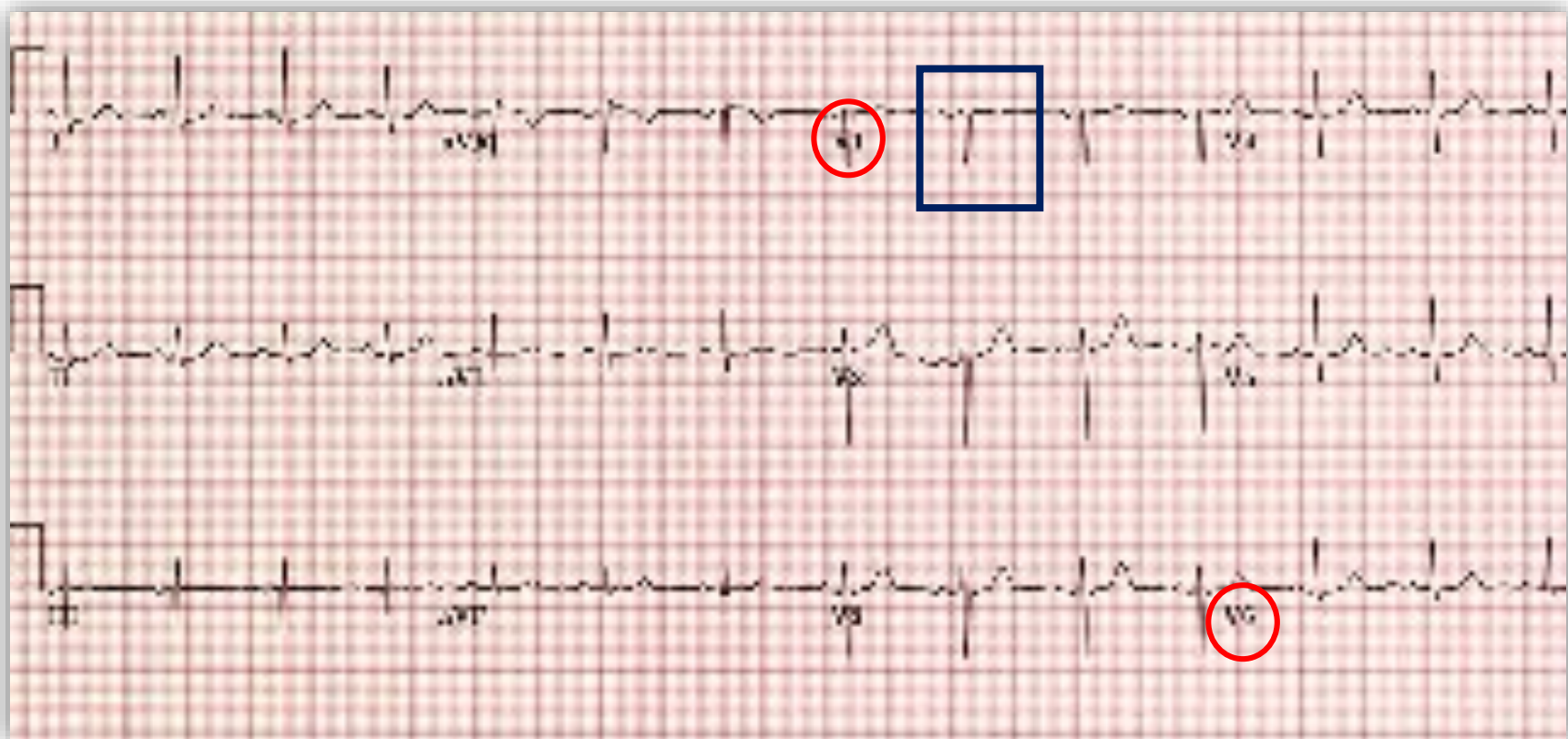
V6

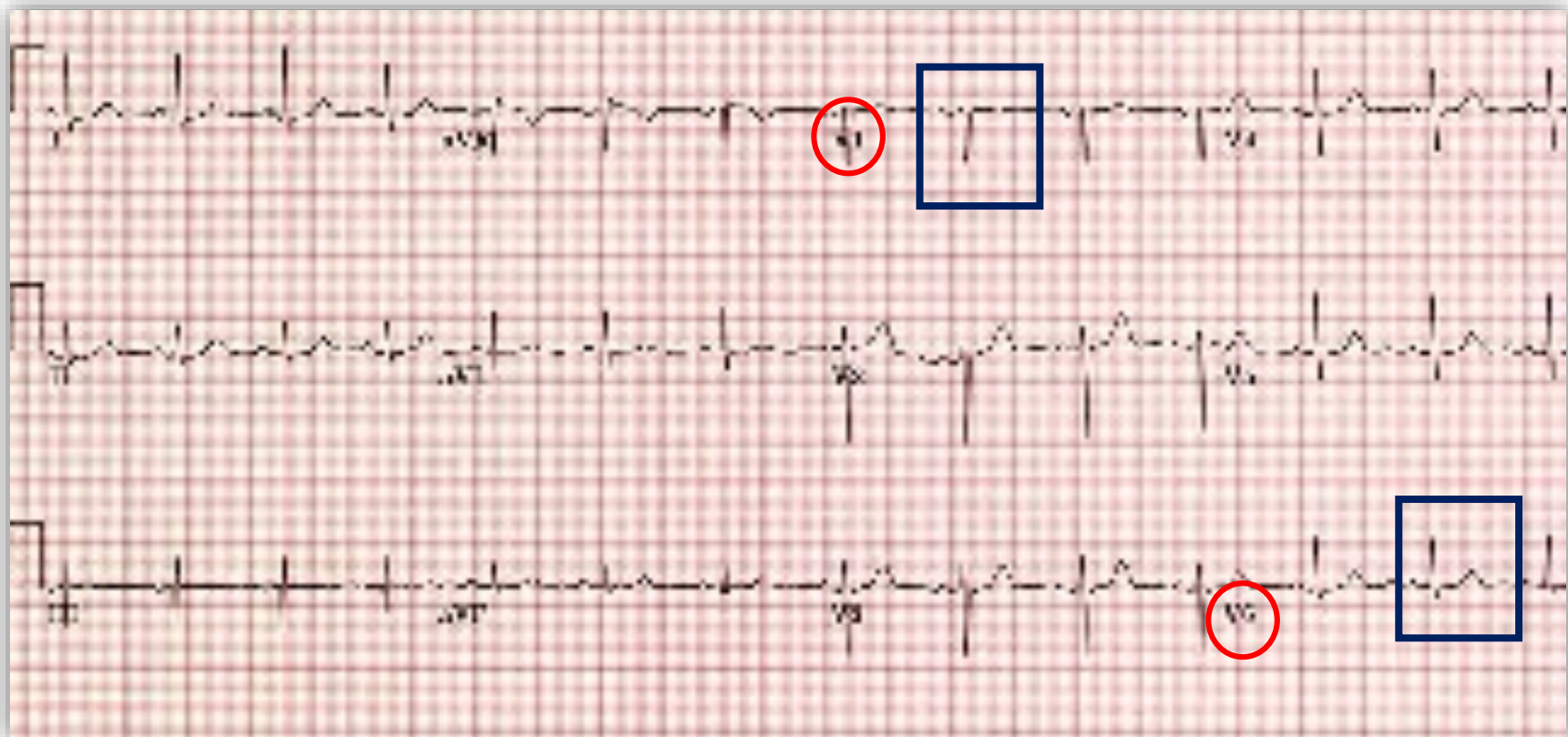


V1







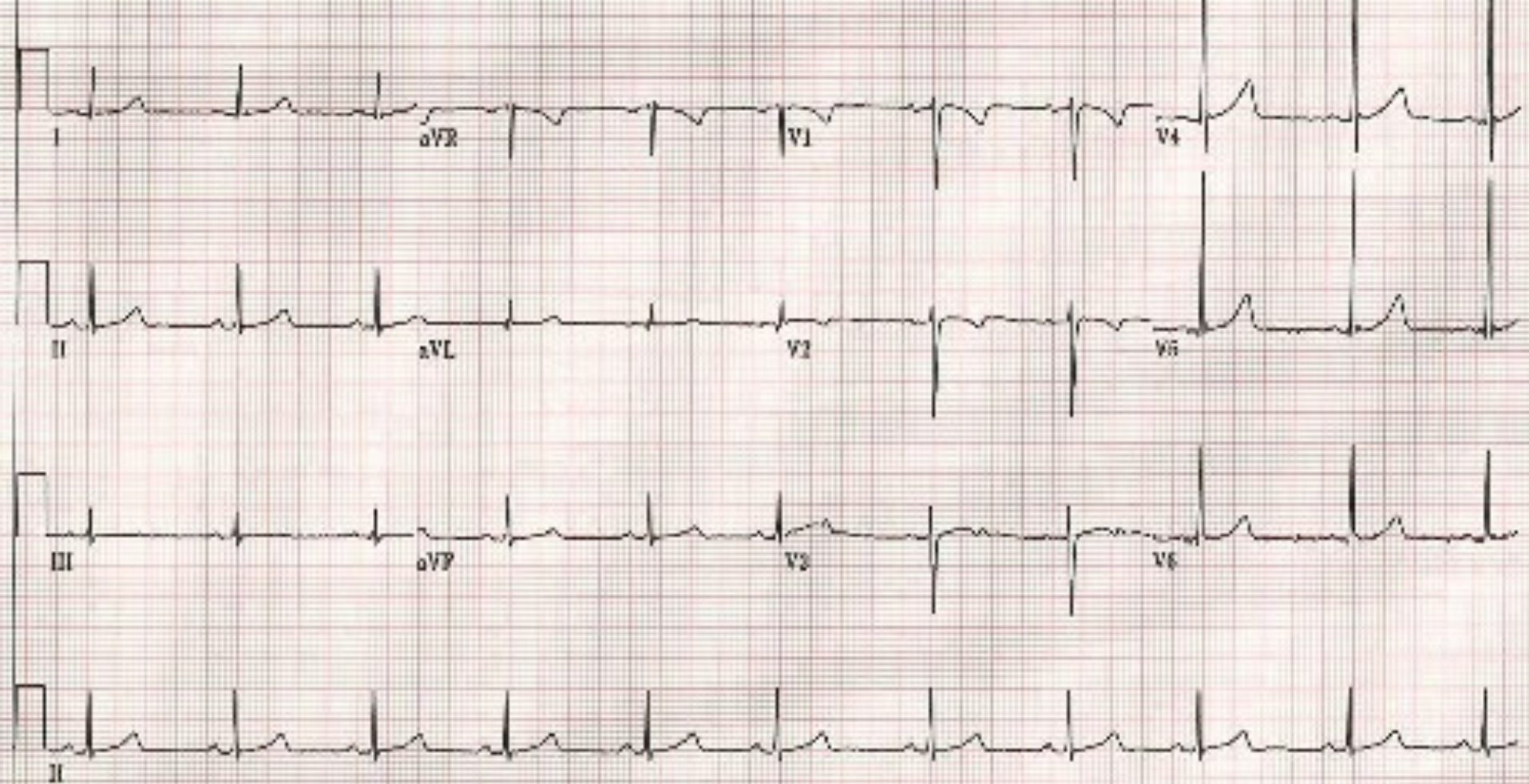


Test Yourself

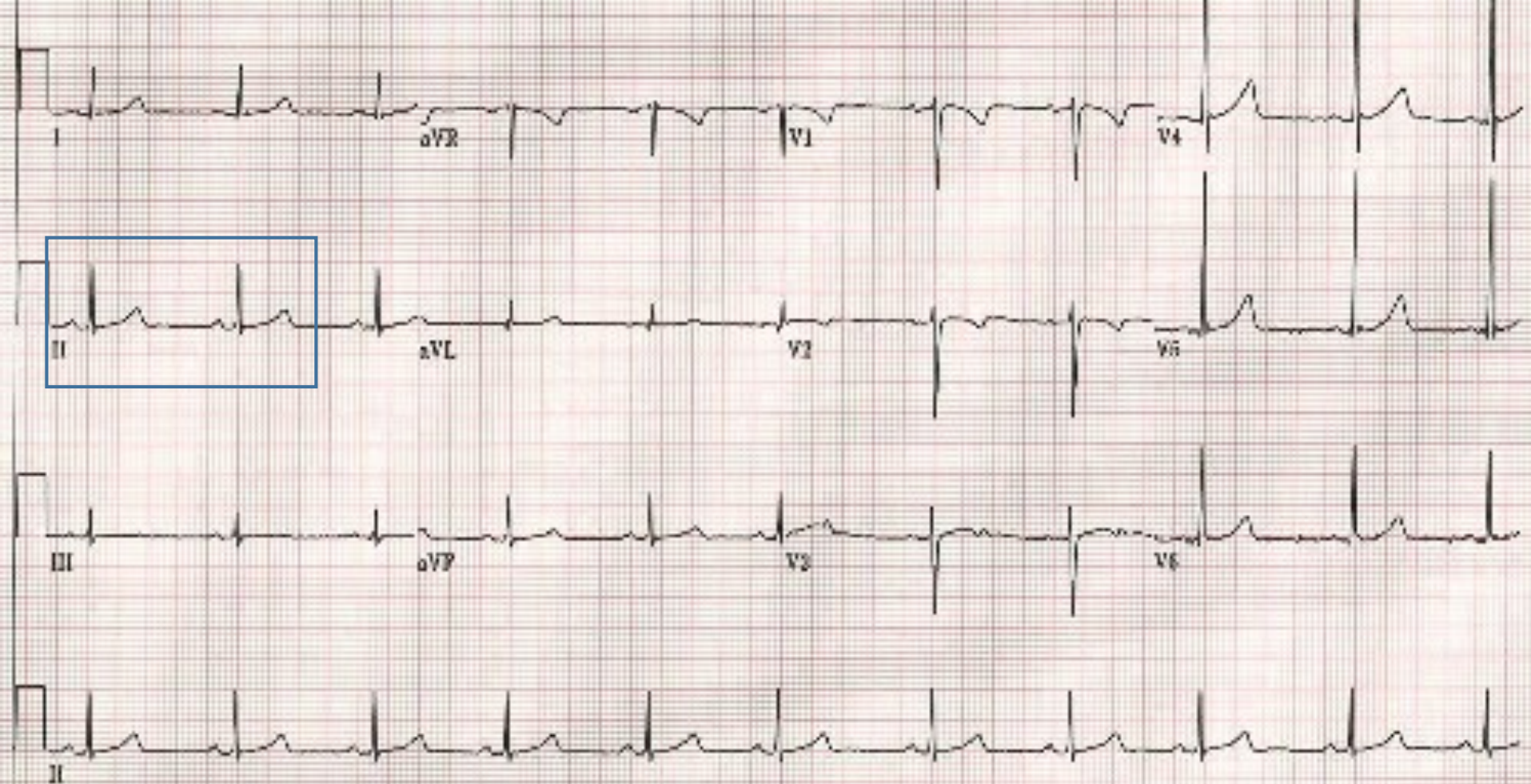


Comment on the following ECGs

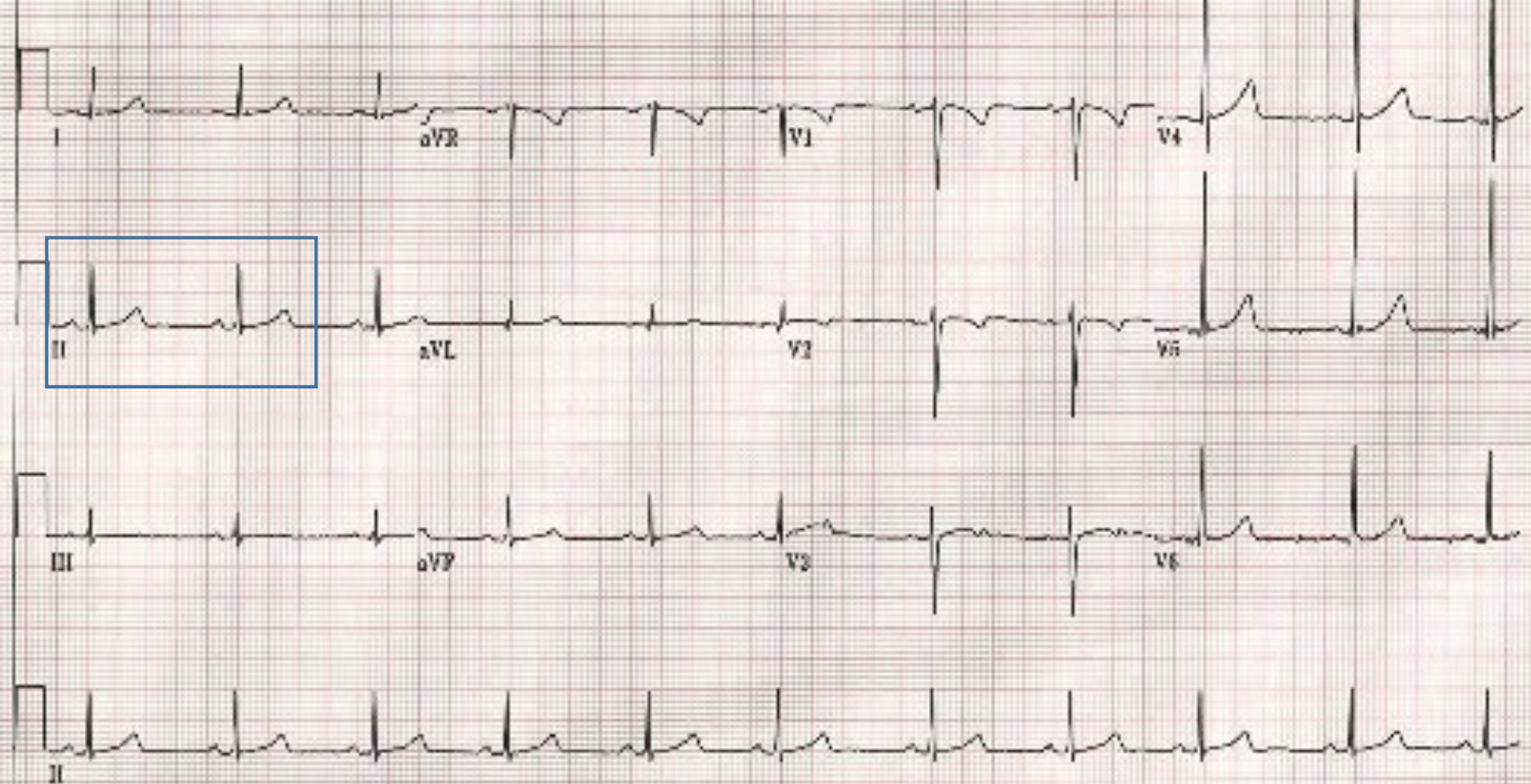




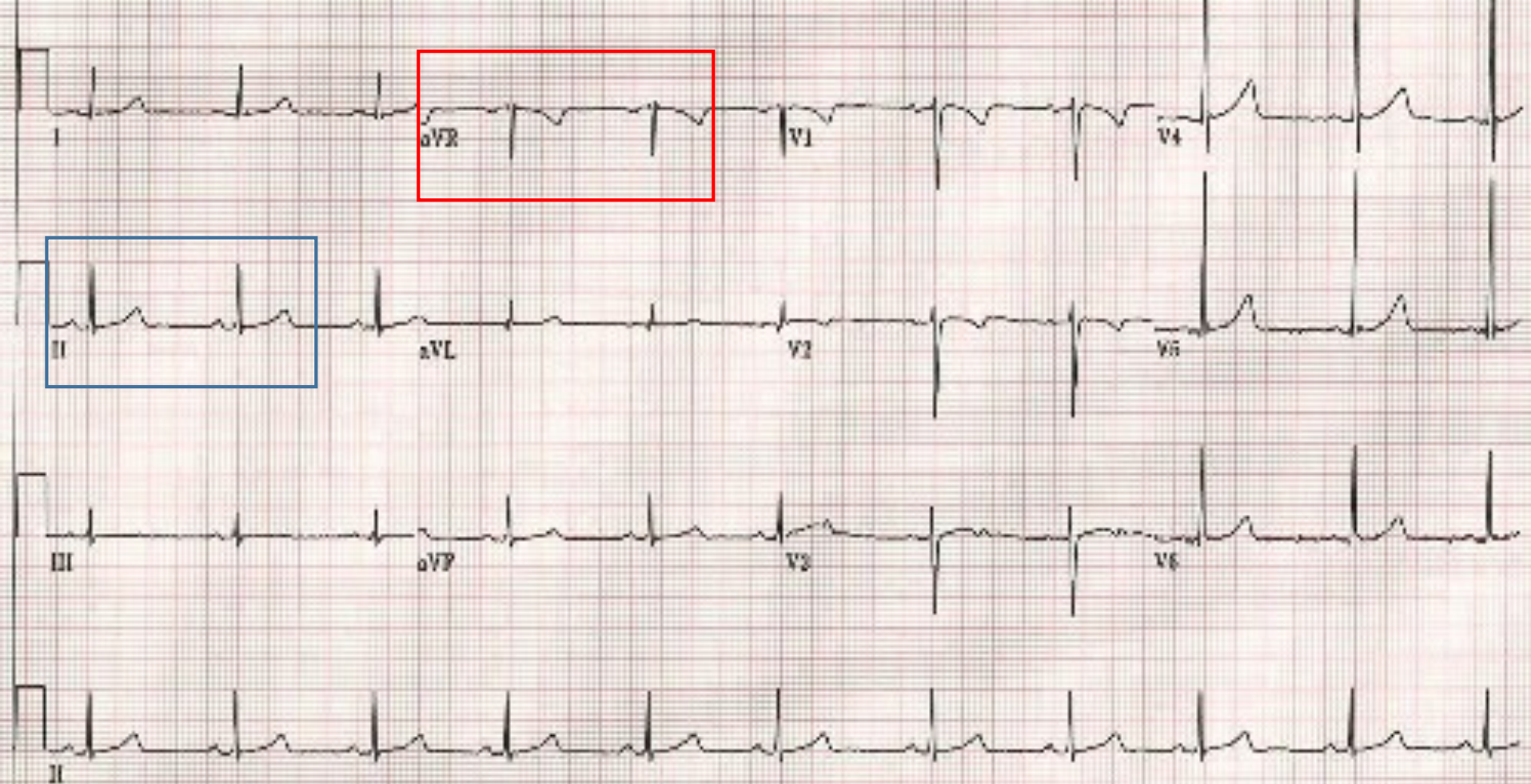
Comment on LII



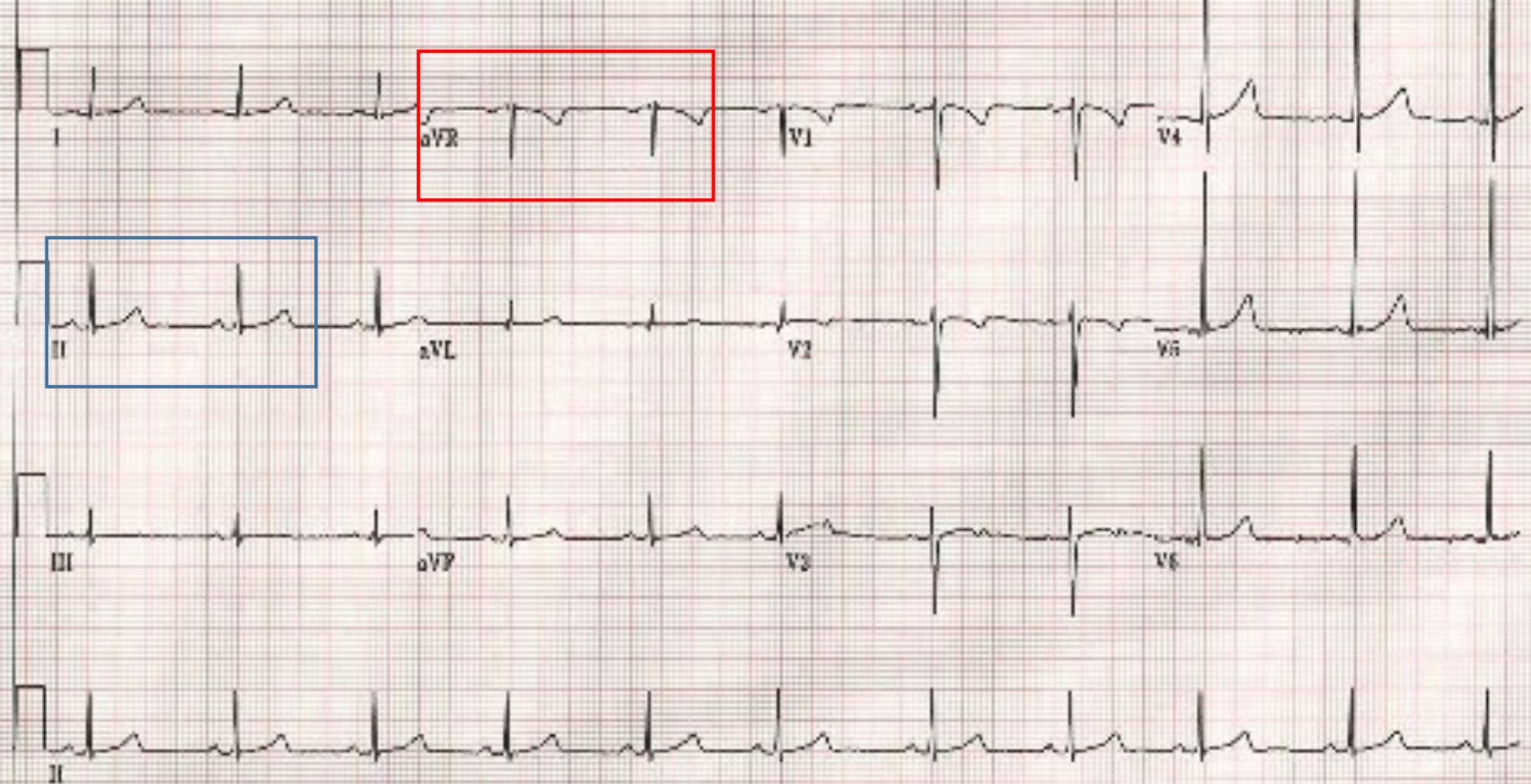
Comment on LII



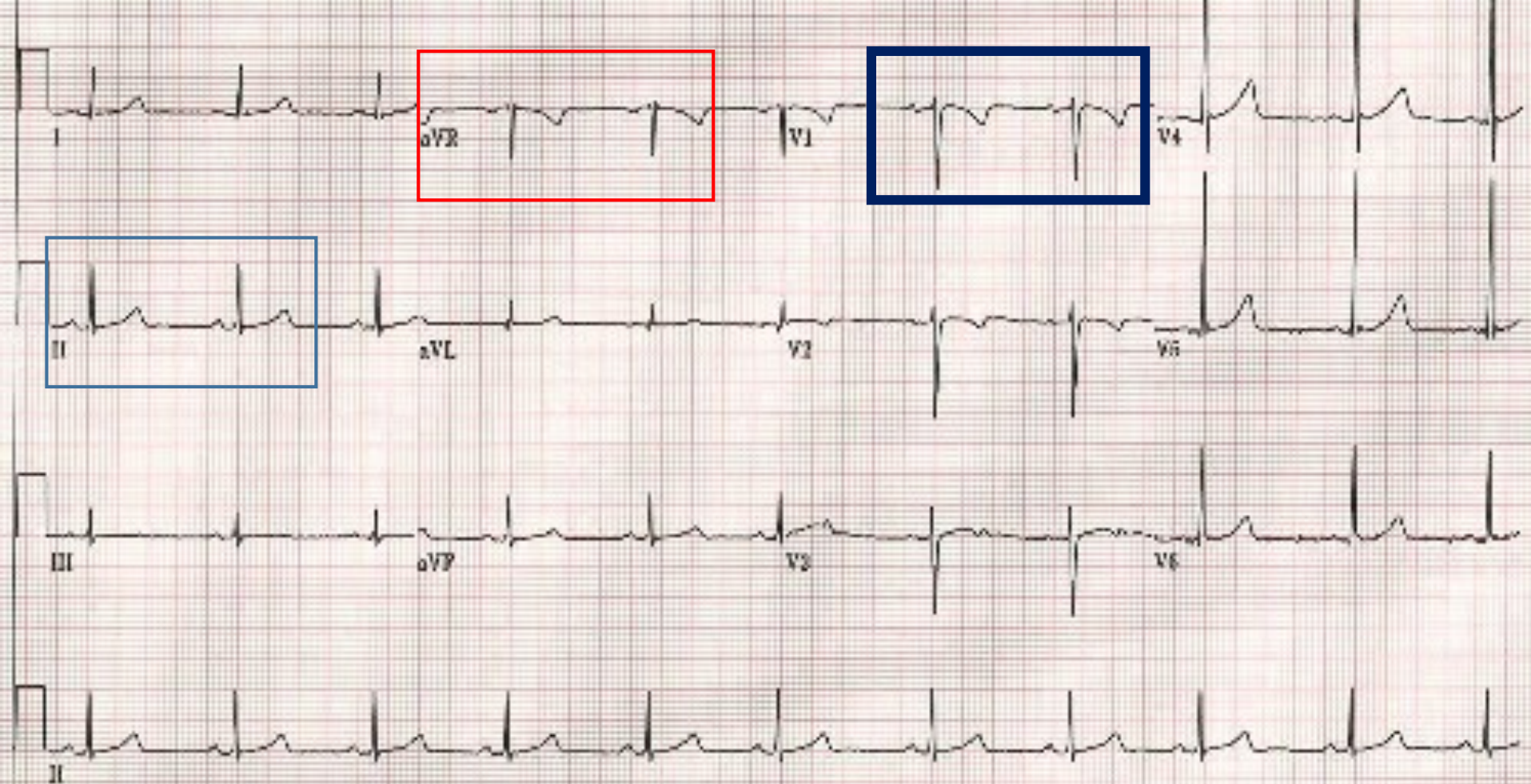
Comment on aVR



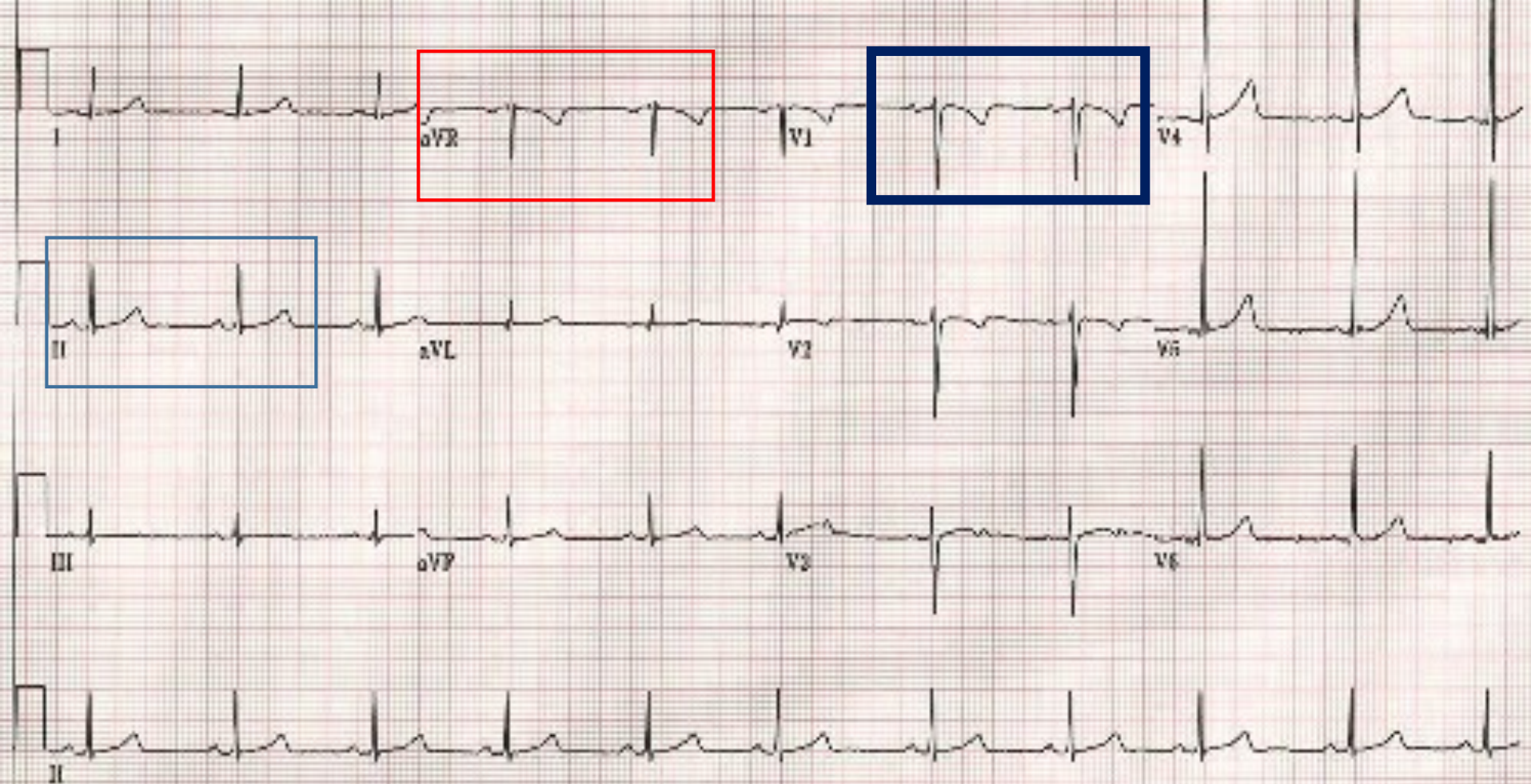
Comment on aVR



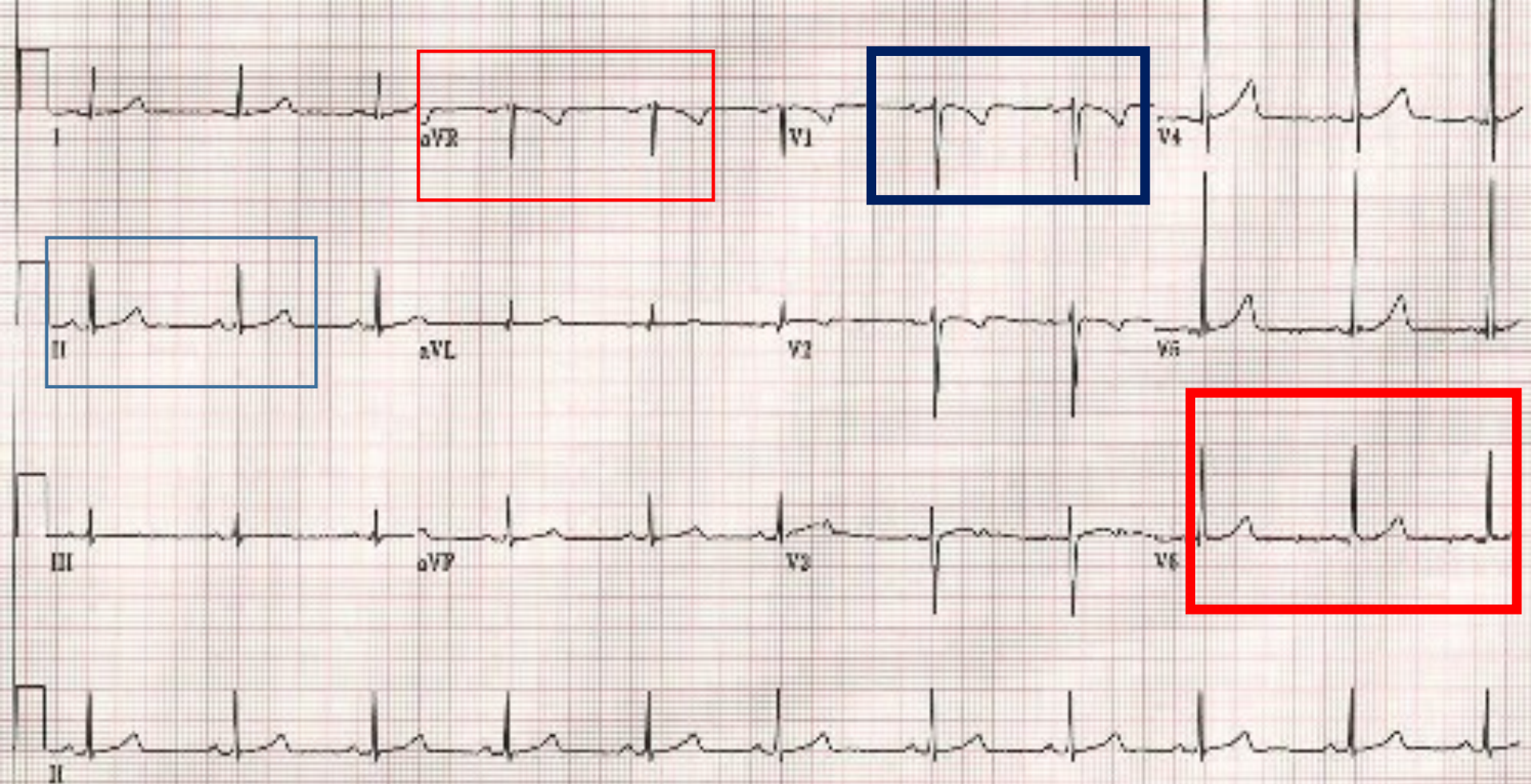
Comment on V1



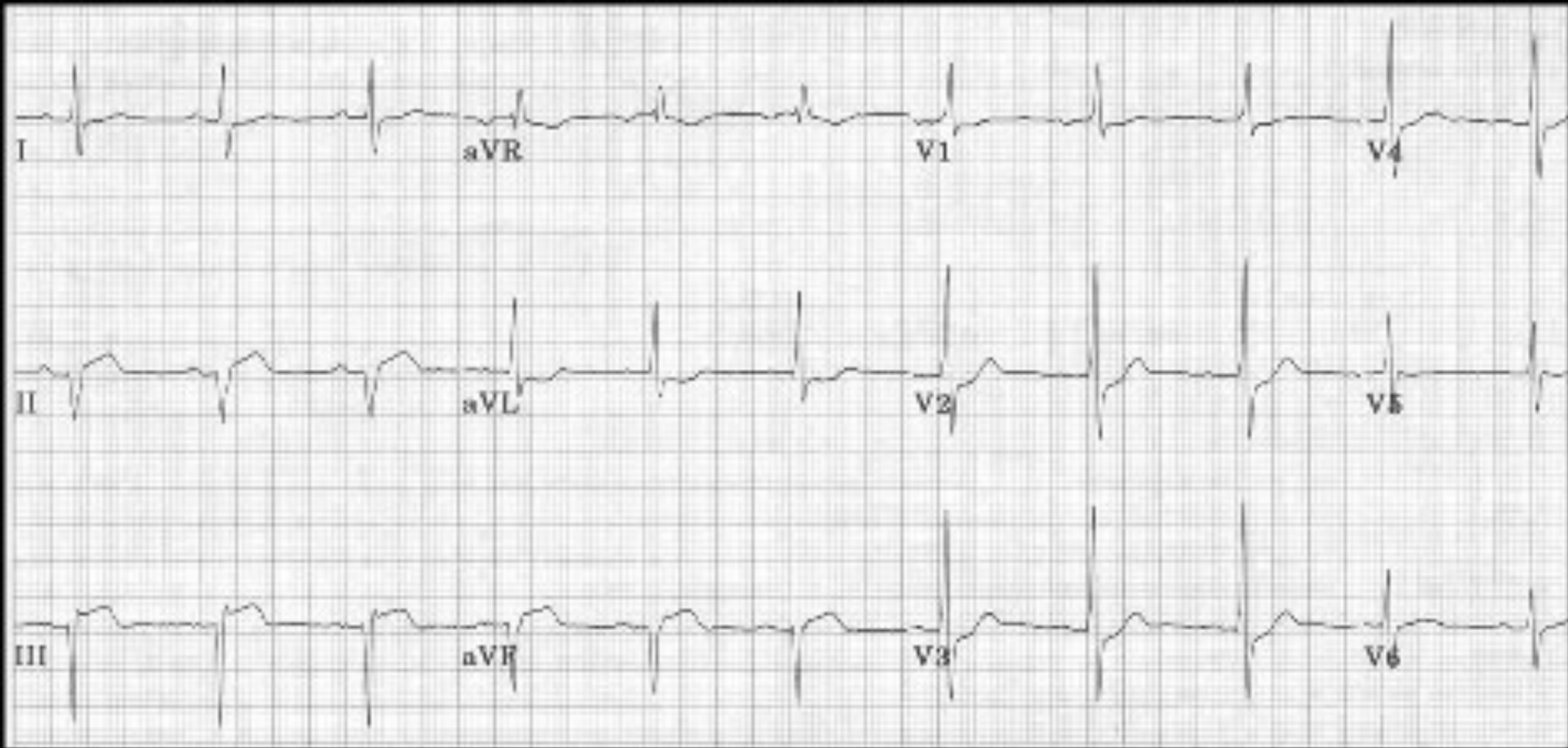
Comment on V1



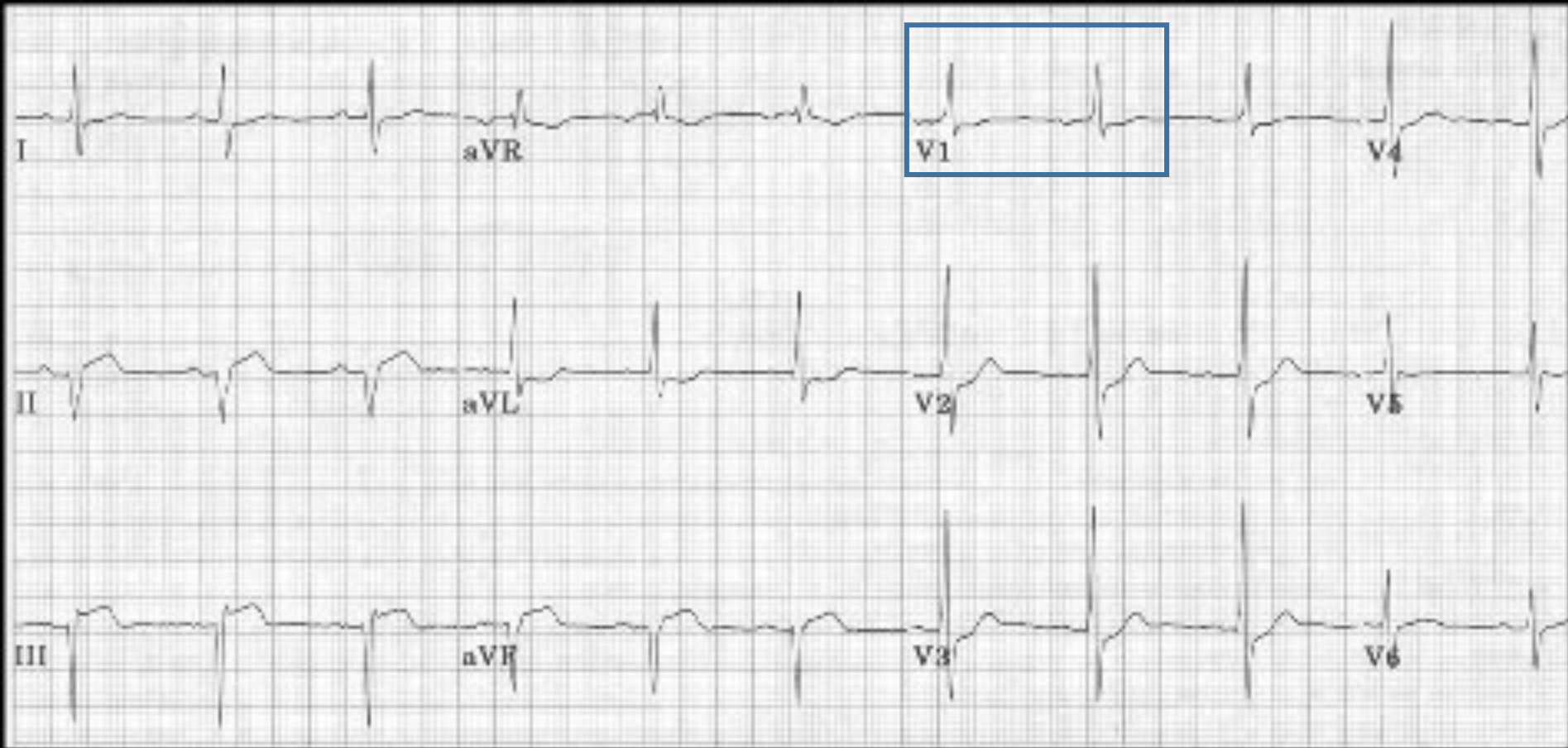
Comment on V6



Comment on V6

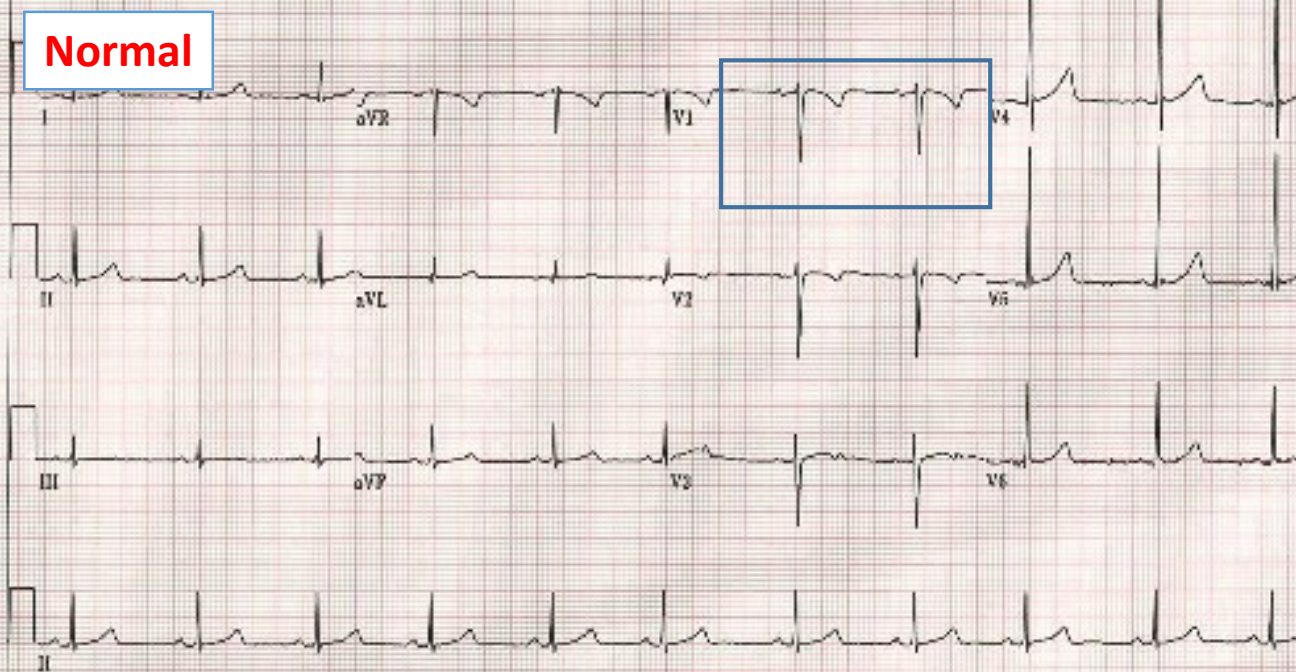


Comment on V1



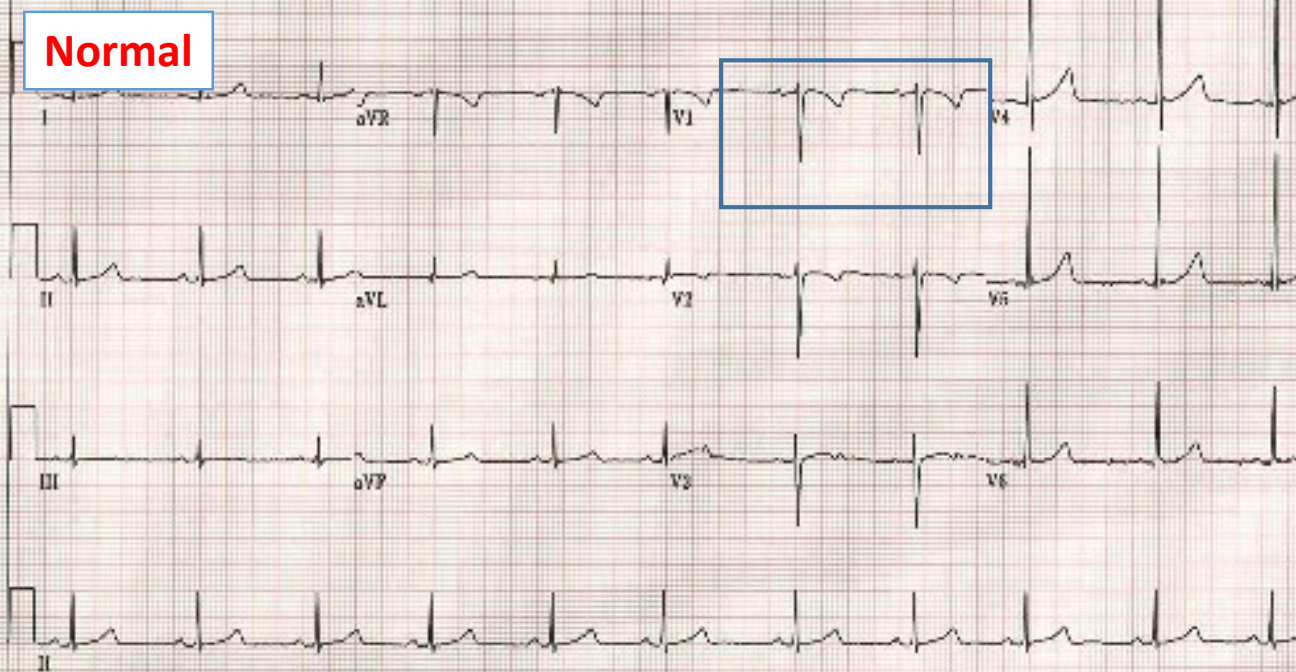
Comment on V1

Normal

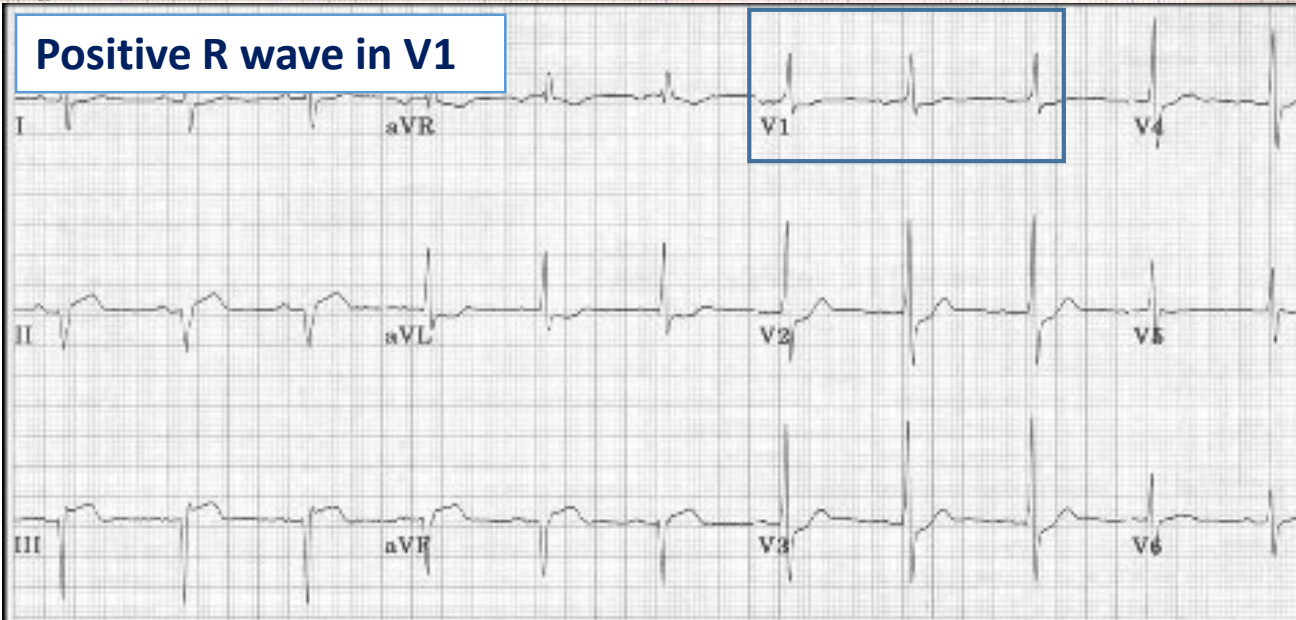


Comment on V1

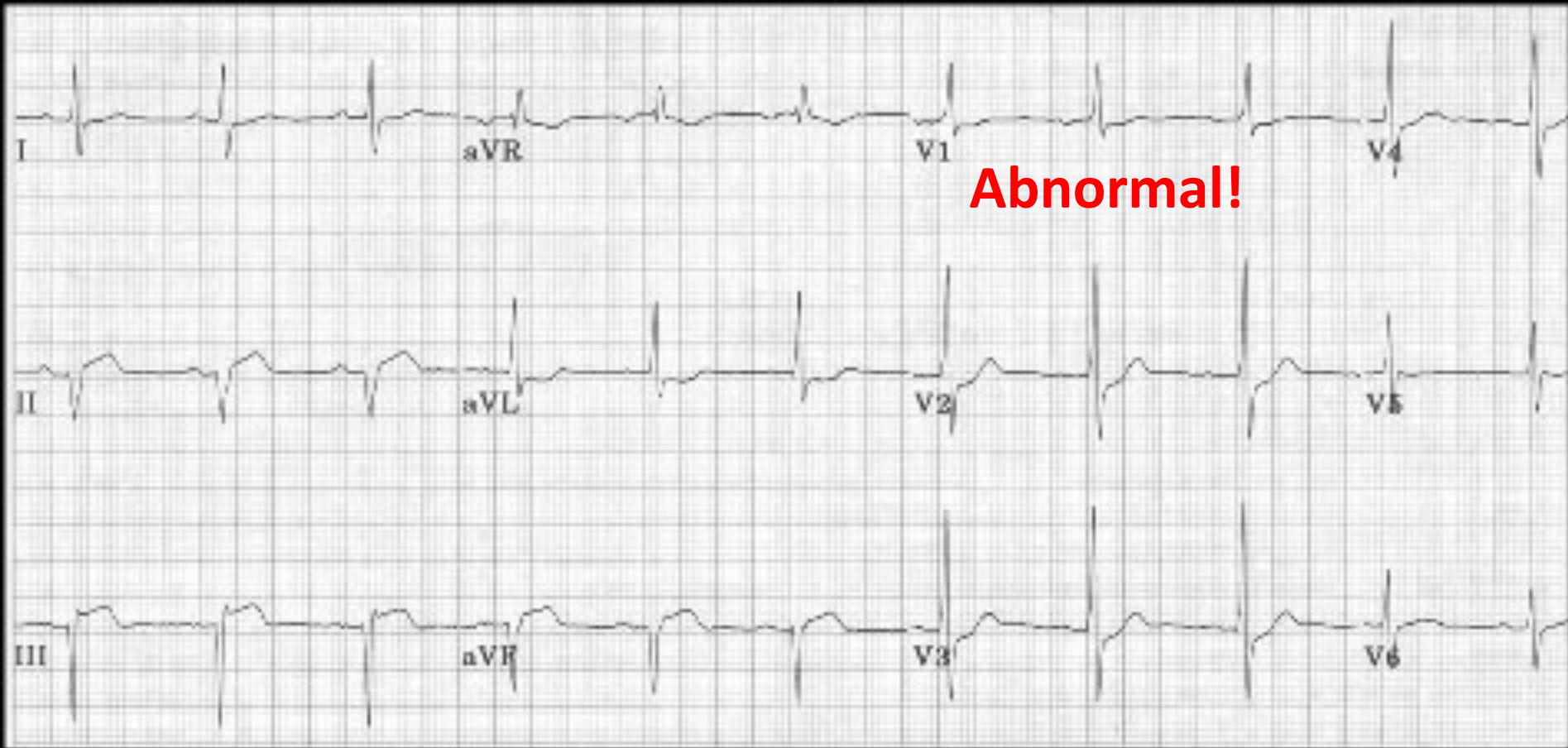
Normal



Positive R wave in V1



Comment on V1



Do not jump to a final diagnosis once you find an abnormality as concomitant probably more serious abnormalities might co-exist with your finding.



- ① The Rhythm**
- ② Heart Rate**
- ③ Axis**

④ 3 Waves

P wave

QRS complex

T wave

⑤ 3 Intervals

P-R interval

S-T segment

Q-T interval



Heart Rhythm

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في هذا الموقع هم تحت حماية قانون الملكية الفكرية

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Cardiac Rhythm

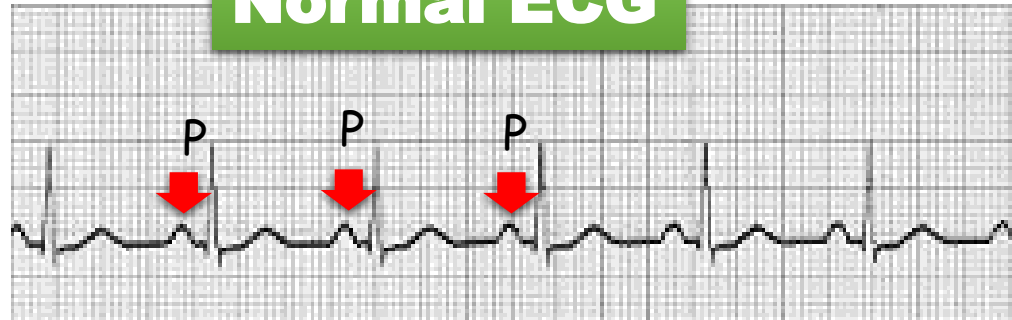




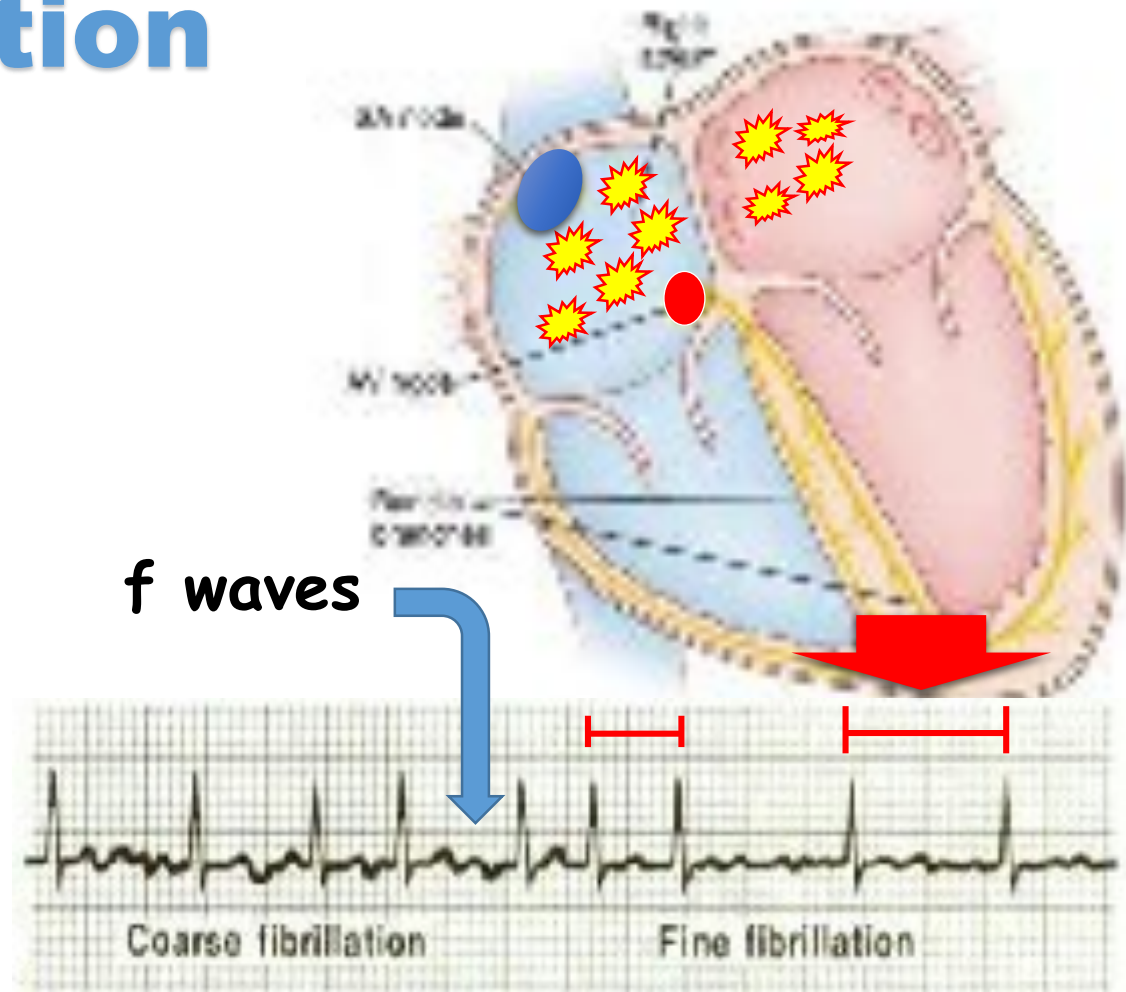
Normal ECG shows a regular rhythm. If you find it irregular you need to consider

- ① Atrial Fibrillation
- ② Multiple Premature beats

Normal ECG

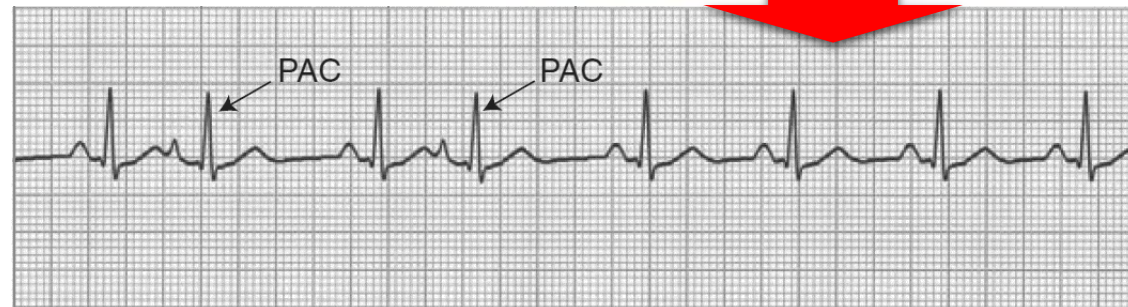
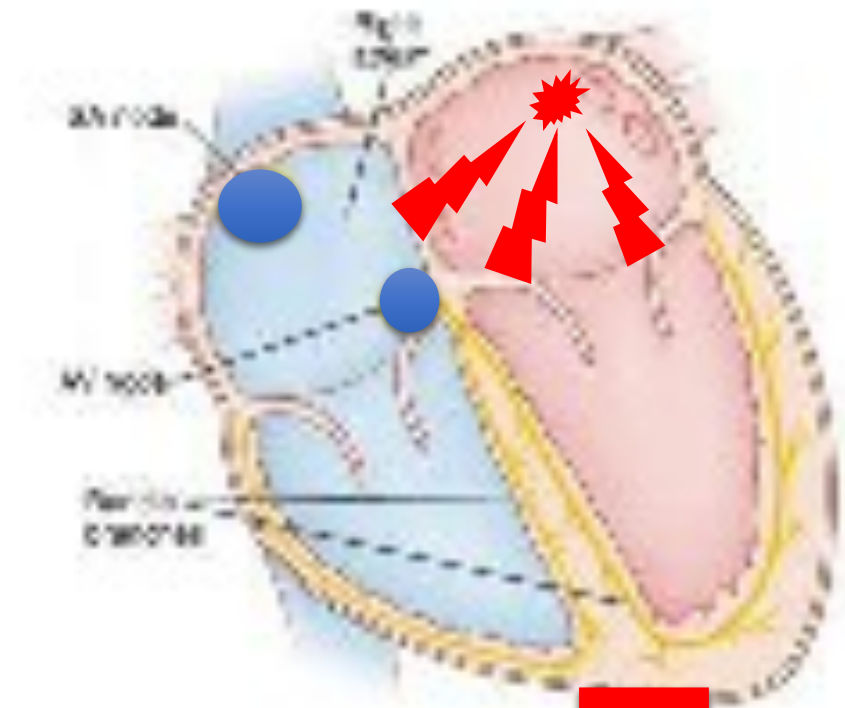


Atrial fibrillation



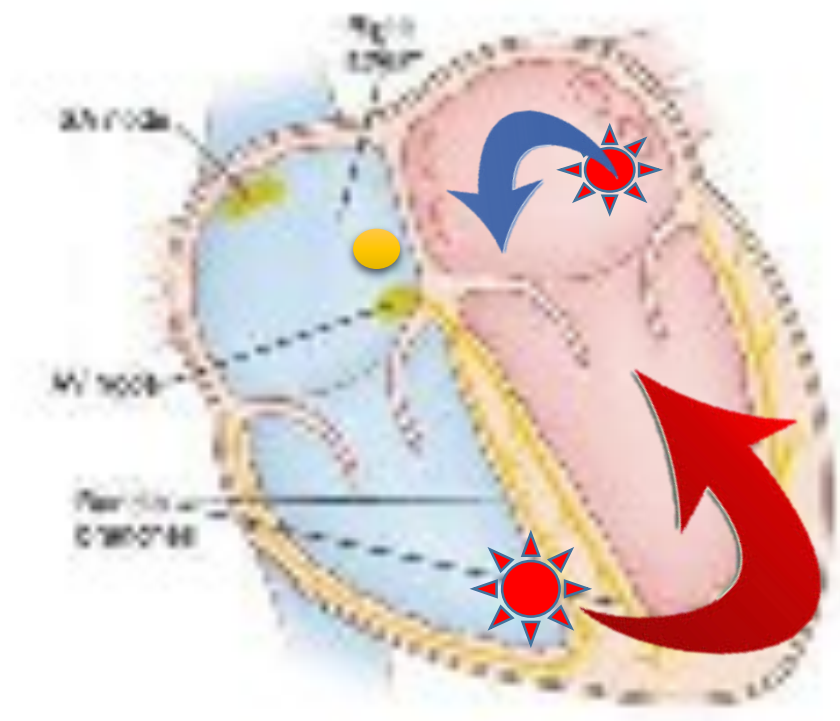
- 1 **Absent P wave**
- 2 **Irregular Cardiac Rhythm**

PMC

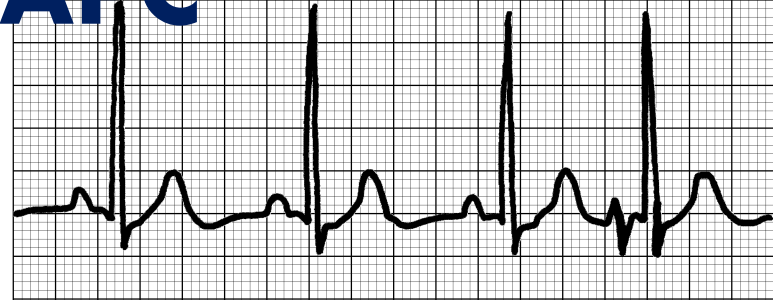


In Multiple Premature Contractions ECG appears irregular

Types of PMCs



APC



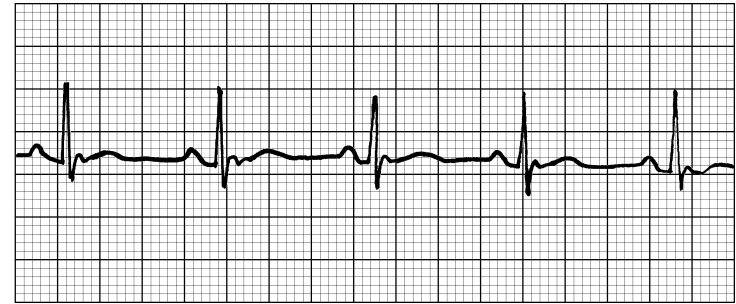
VPC



**Let us revise
the Cardiac
Rhythm
together**



Rhythm



Regular

Rhythm



APC



**Occasional
Irregularity**

Rhythm

VPC

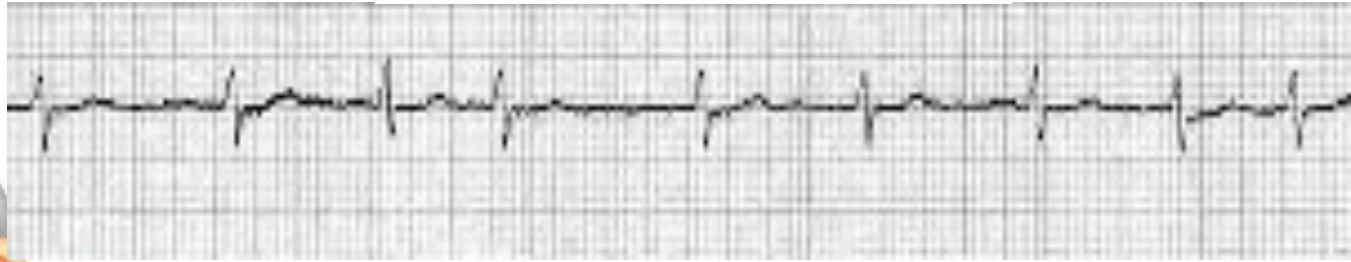


**Occasional
Irregularity**



Rhythm

Atrial fibrillation



**Total
Irregularity**



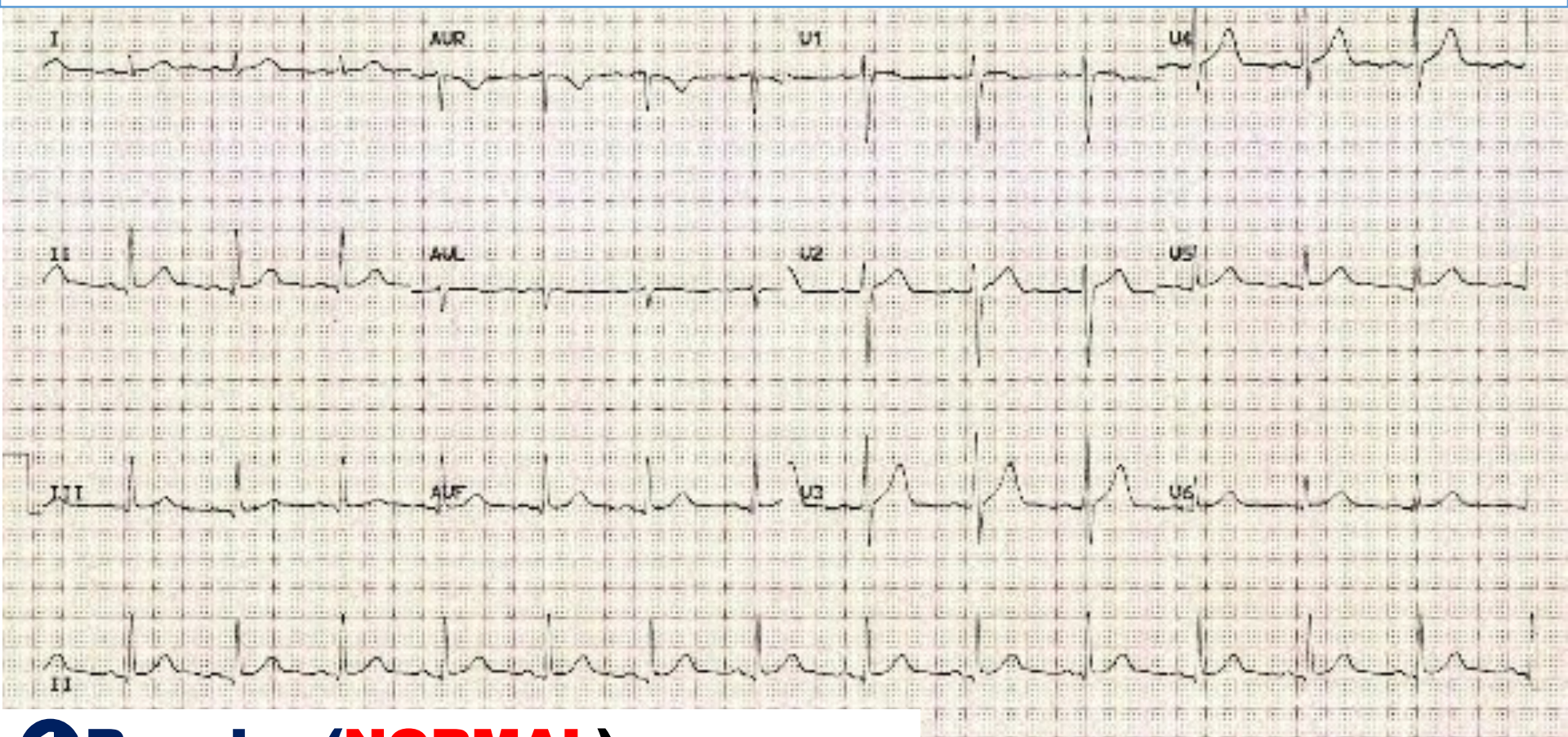
Test Yourself



Comment on the Heart Rhythm



Comment on Heart Rhythm



- ① Regular (**NORMAL**)
- ② Occasional irregularity
- ③ Irregular

Comment on Heart Rhythm



① PAC

② PVC

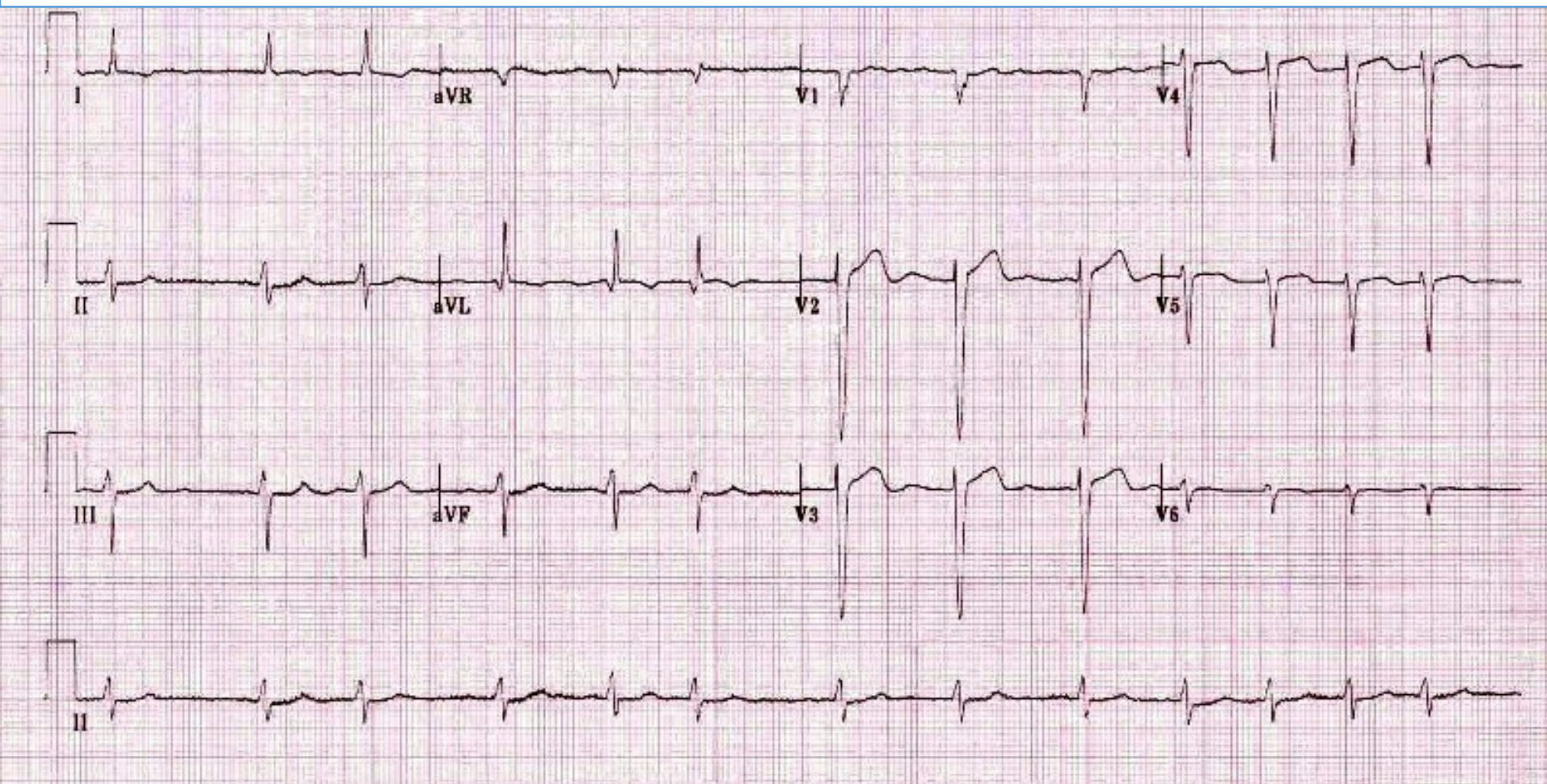
Comment on Heart Rhythm



① PAC

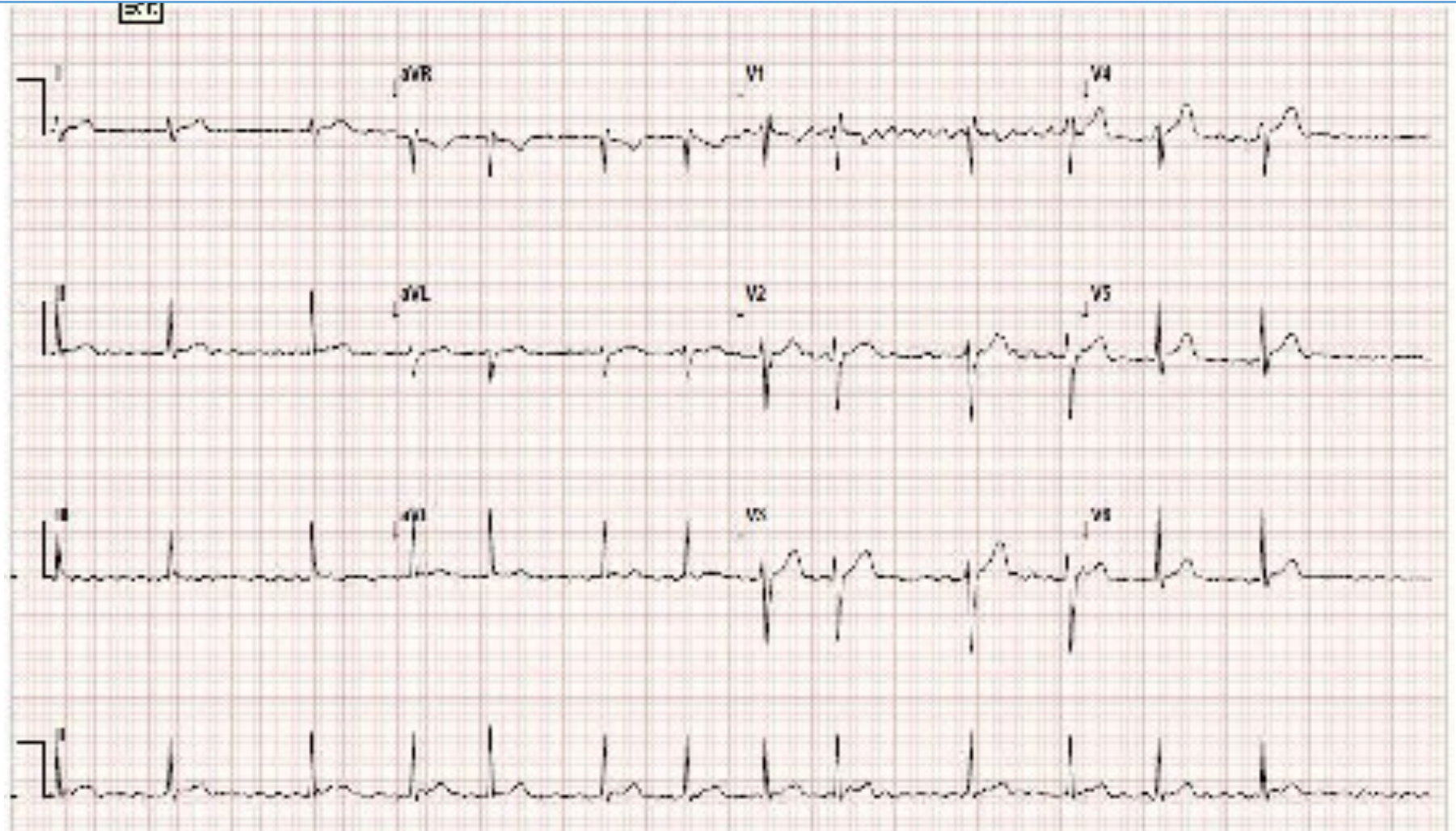
② PVC

Comment on Heart Rhythm

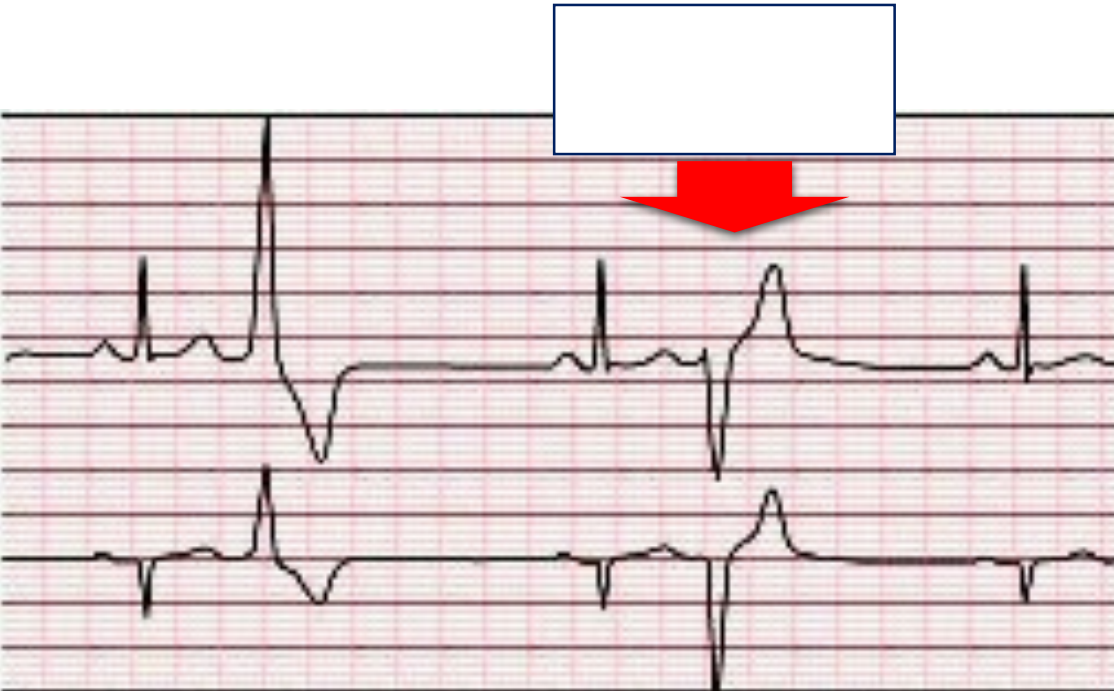
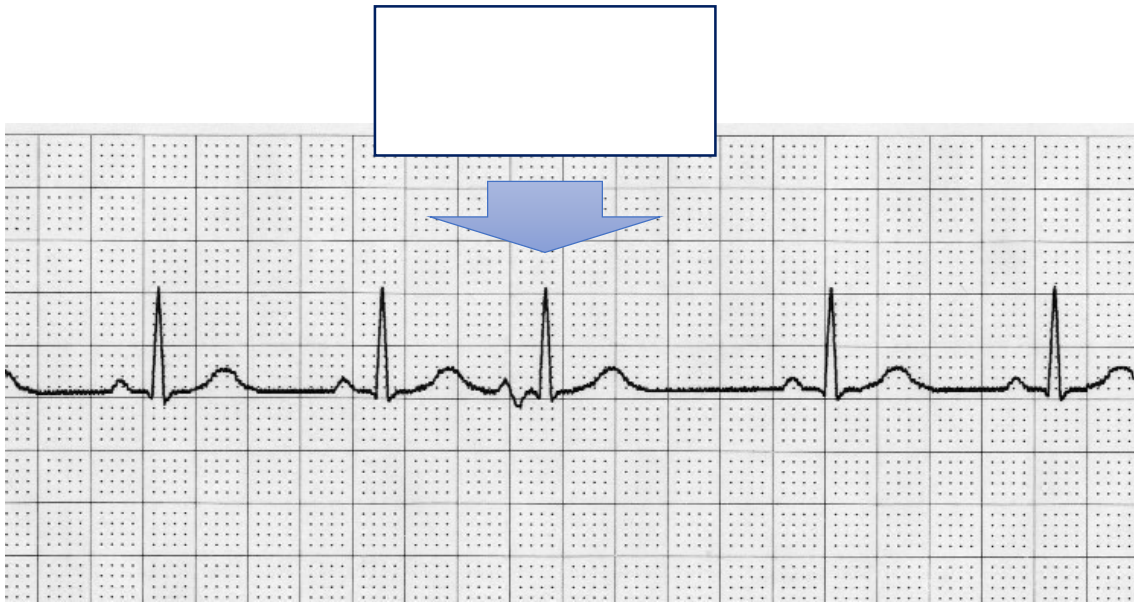


- ① Regular
- ② Occasional irregularity
- ③ Irregular (**AF**)

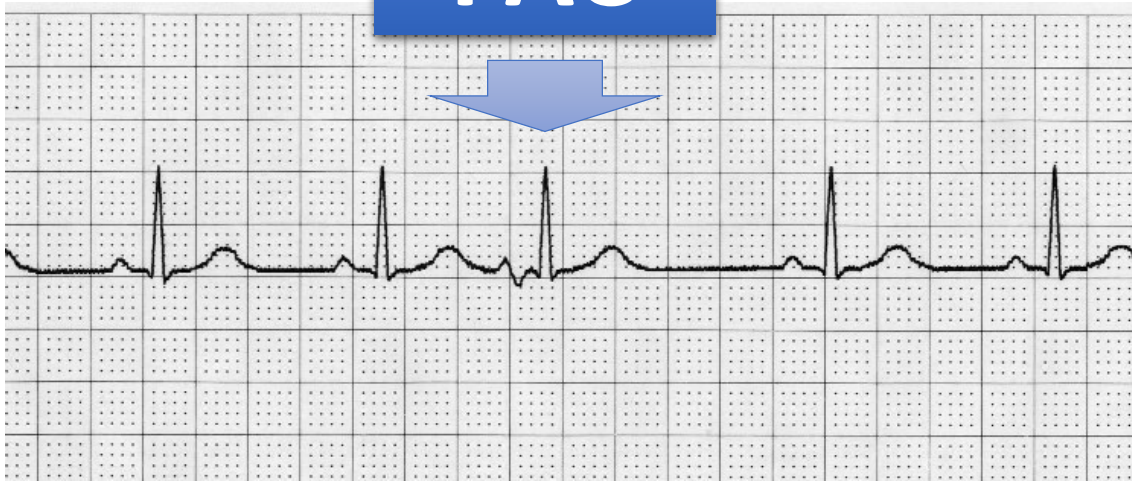
Comment on Heart Rhythm



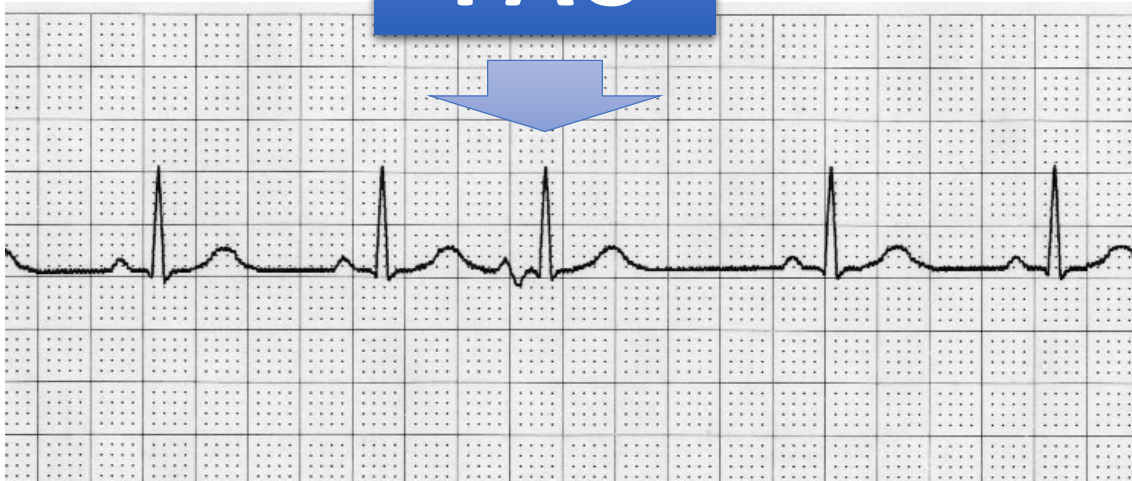
- ① Regular
- ② Occasional irregularity
- ③ Irregular (**AF**)



PAC

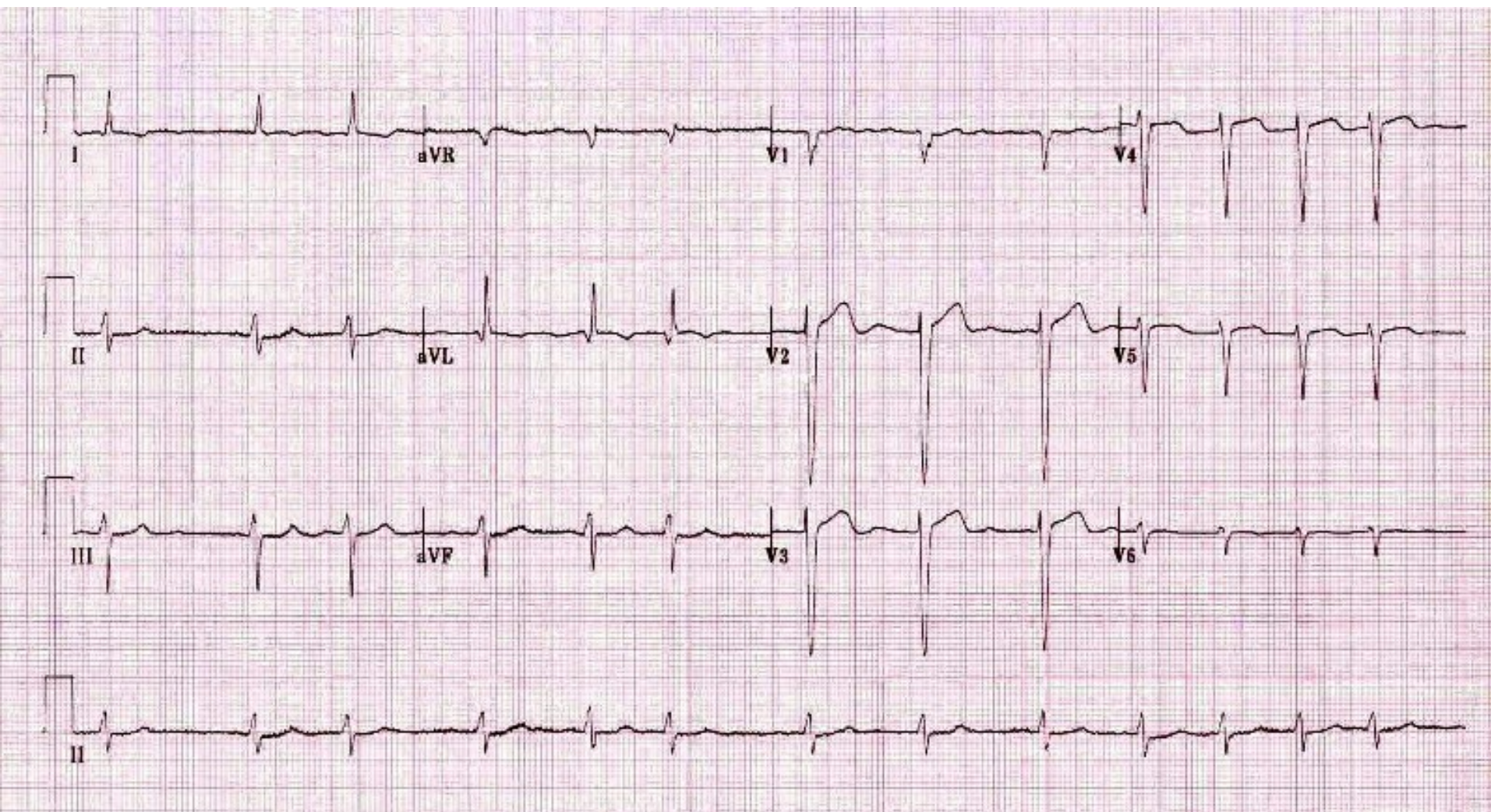


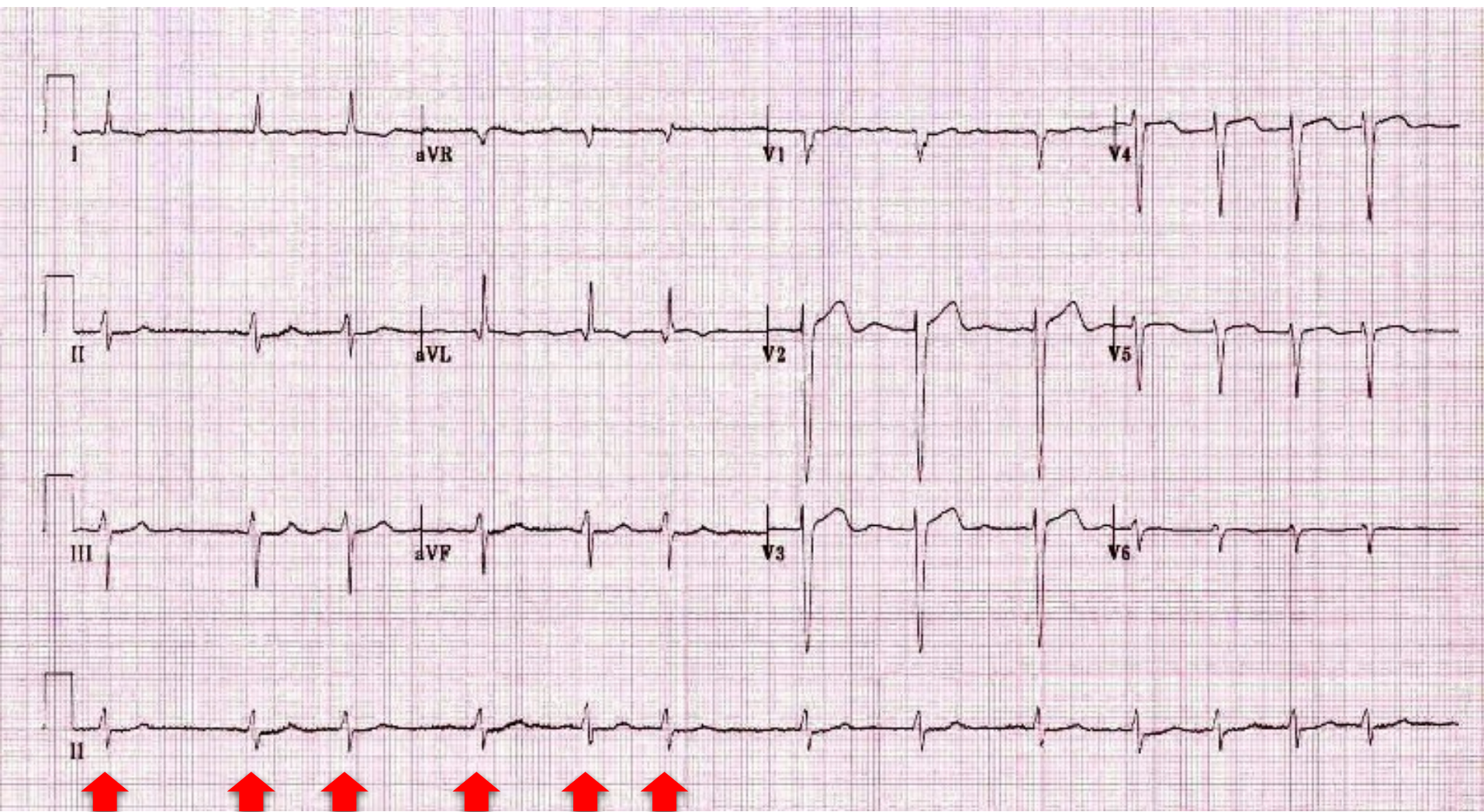
PAC

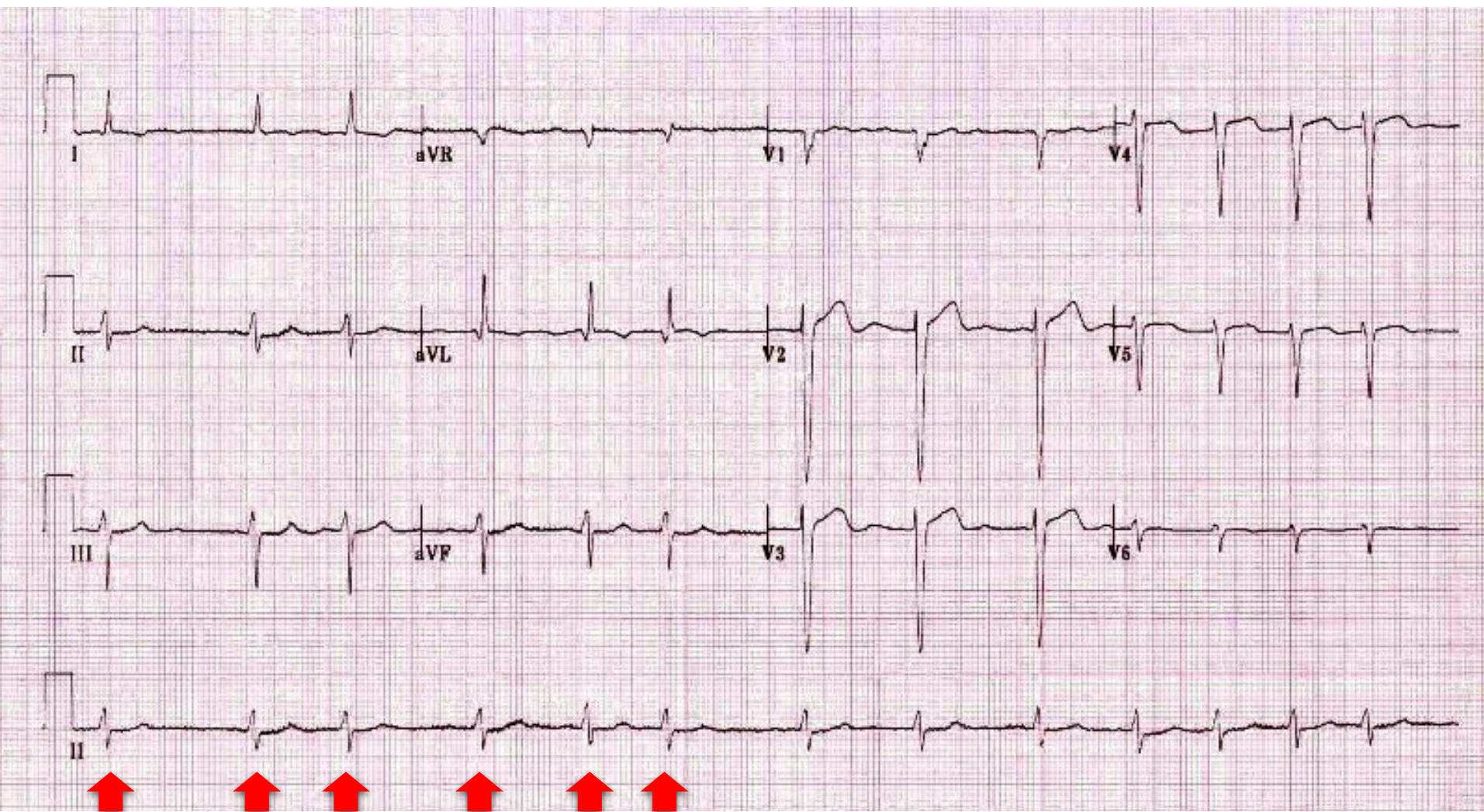


PVC









Atrial fibrillation

Heart Rate

Level I



Dr. Tarek Abdelhamid M.D.

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فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص برجاء
الإتصال بالدكتور طارق عبد الحميد

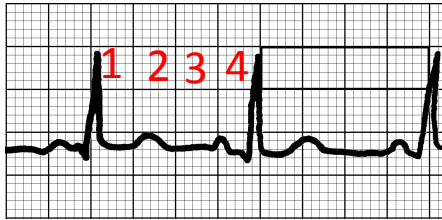


Heart Rate

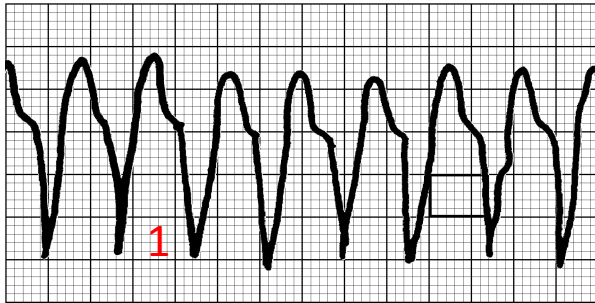


If Regular

300/Number of Big Squares between 2 adjacent QRS complexes



$$300/4 = 75 \text{ beats/minute}$$



$$300/1.5 = 200 \text{ beats/minute}$$

1



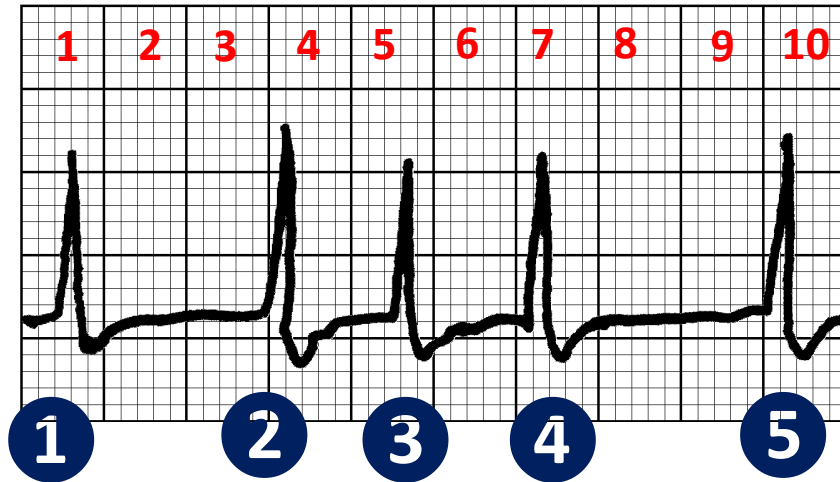
$$300/5 = 60 \text{ beats/minute}$$

If Irregular

Number of QRS complexes in 10 Big Squares x 30

Number of QRS complexes in 20 Big Squares x 15

Number of QRS complexes in 30 Big Squares x 10

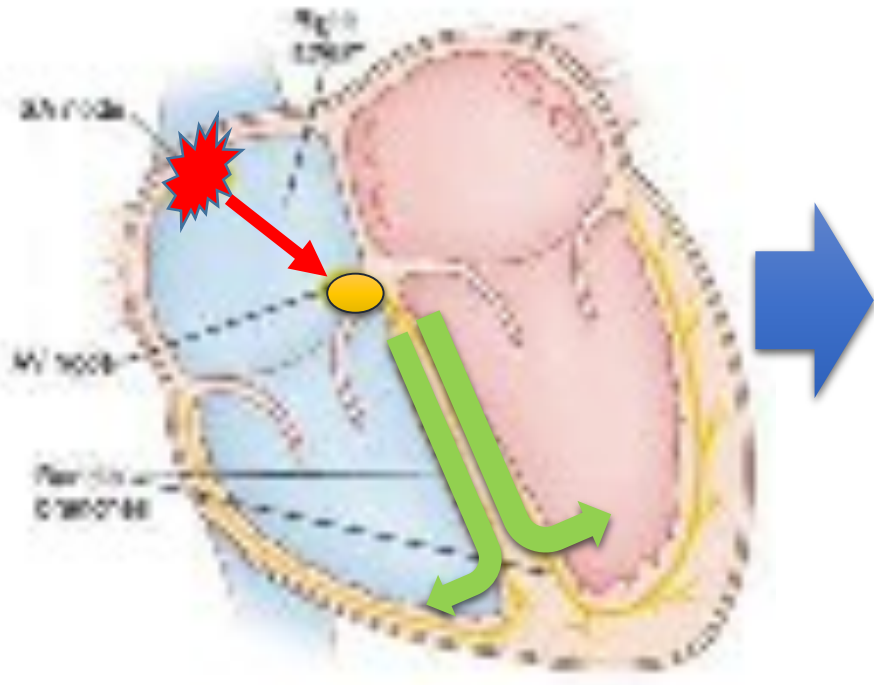


HR of this ECG = $5 \times 30 =$
150 Beats/minute

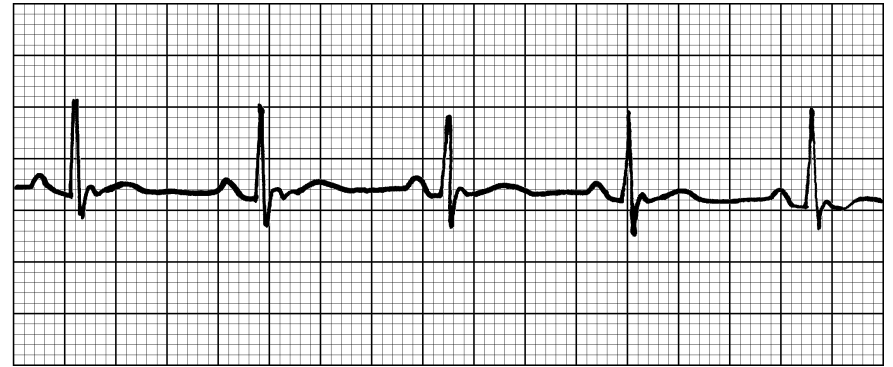
Tachycardia



Normal Heart

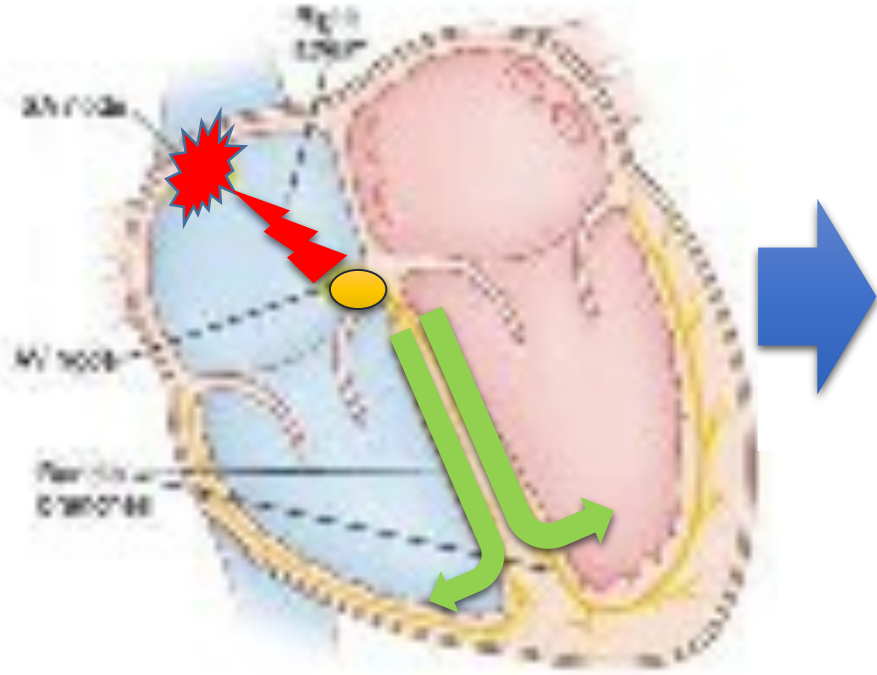


Normal ECG



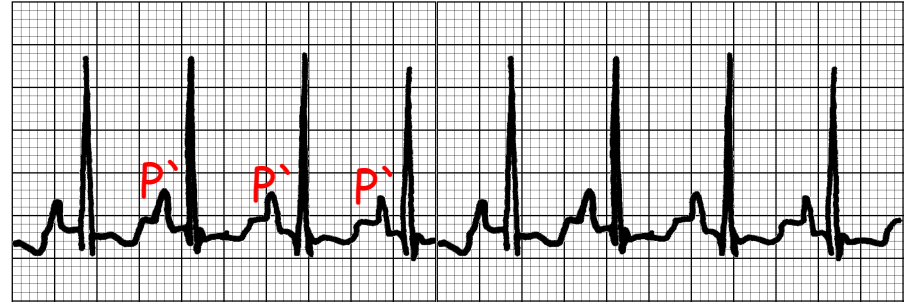
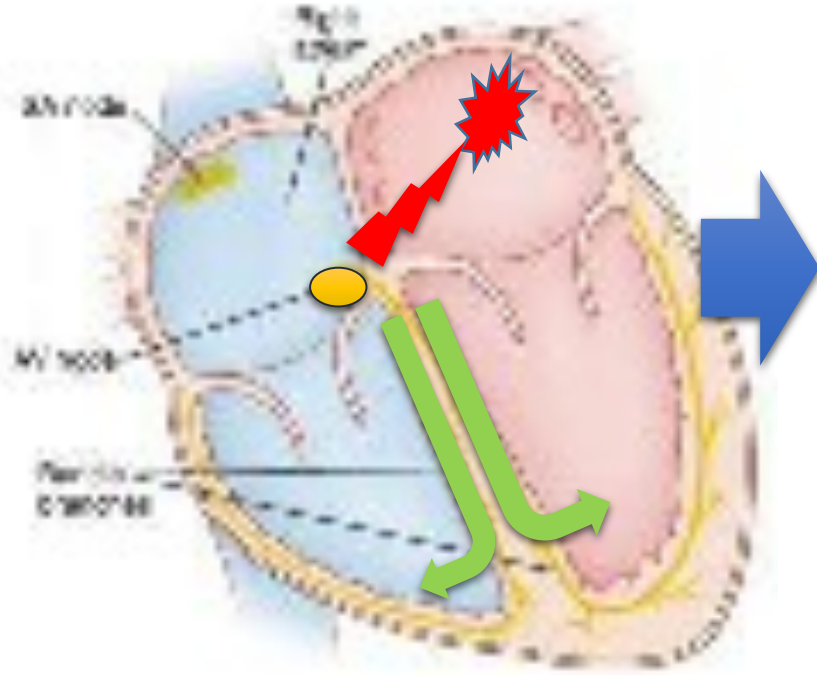
(60-90 beats/minute)

Sinus Tachycardia



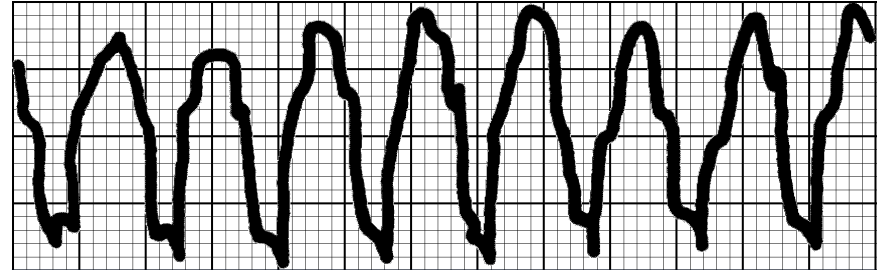
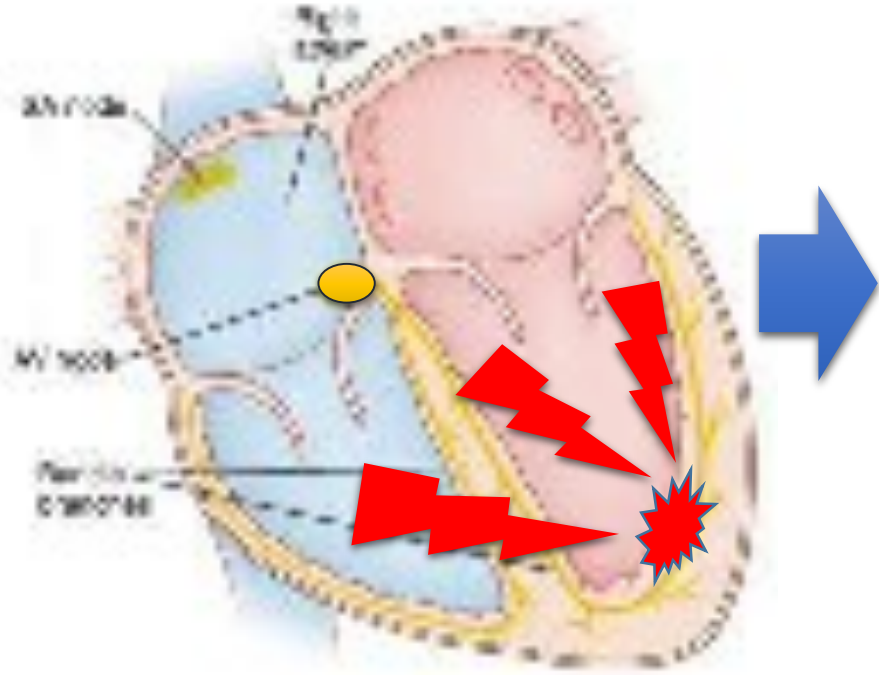
Normal shape ECG

SVT



Normal QRS complexes but **P**
waves are of unusual shape

Ventricular Tachycardia

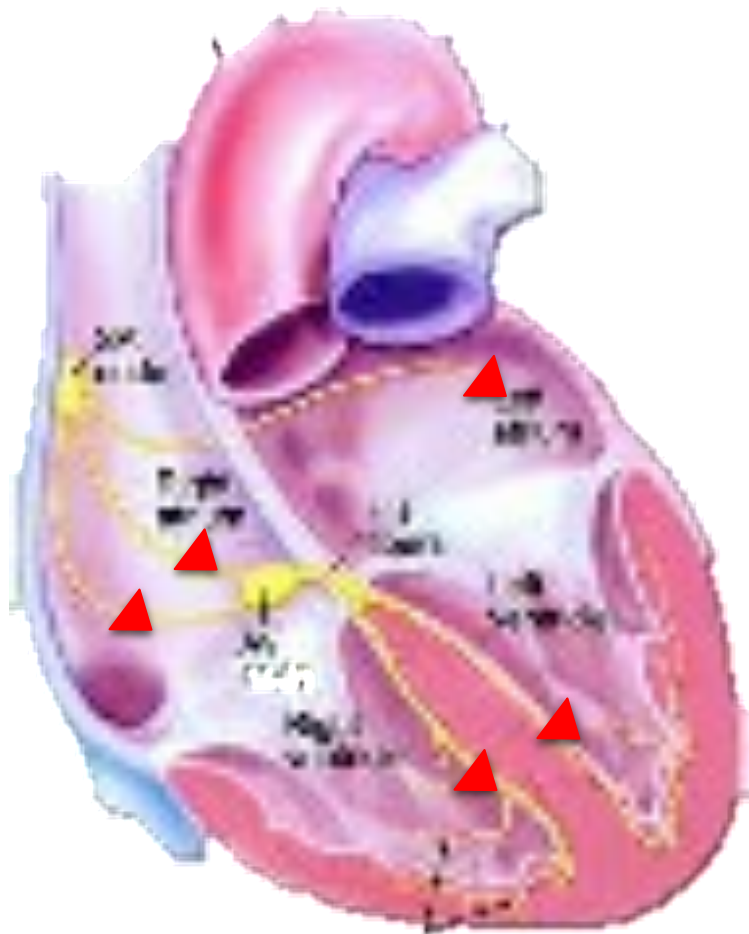


**Wide bizarre QRS
Complexes.**

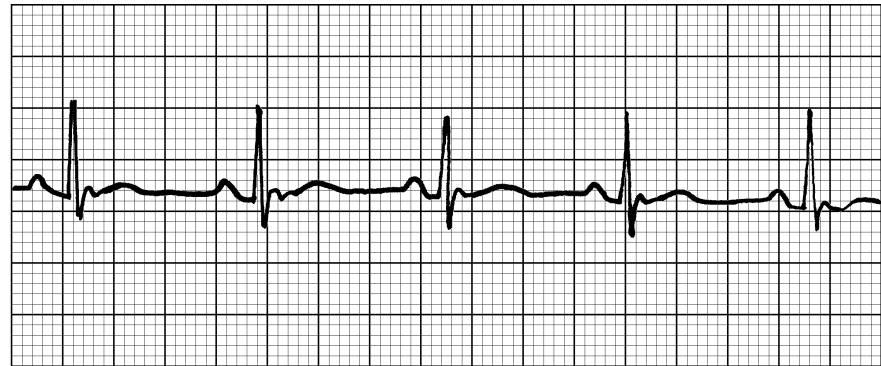
Bradycardia



Normal ECG



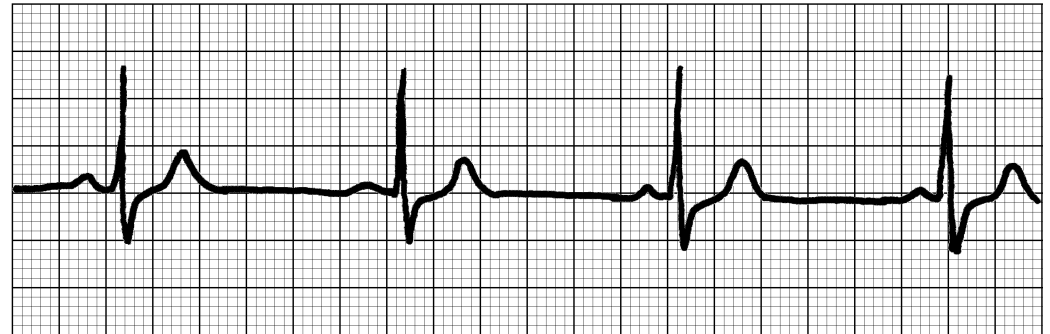
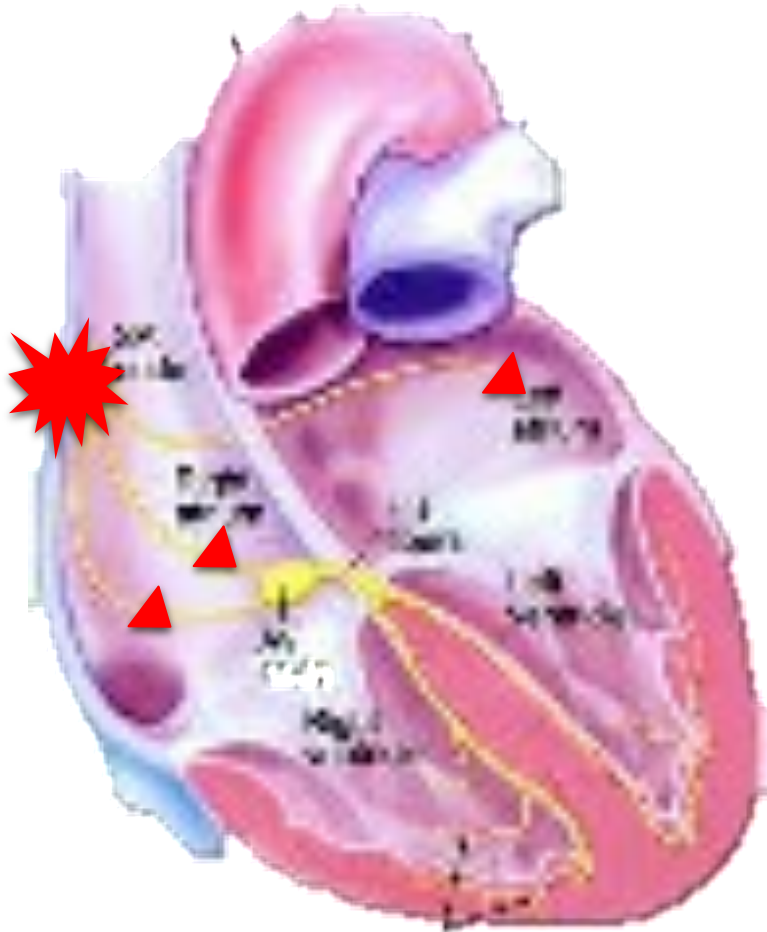
Normal ECG



(60-90 beats/minute)

Sinus Bradycardia

Sinus Bradycardia
QRS has normal shape

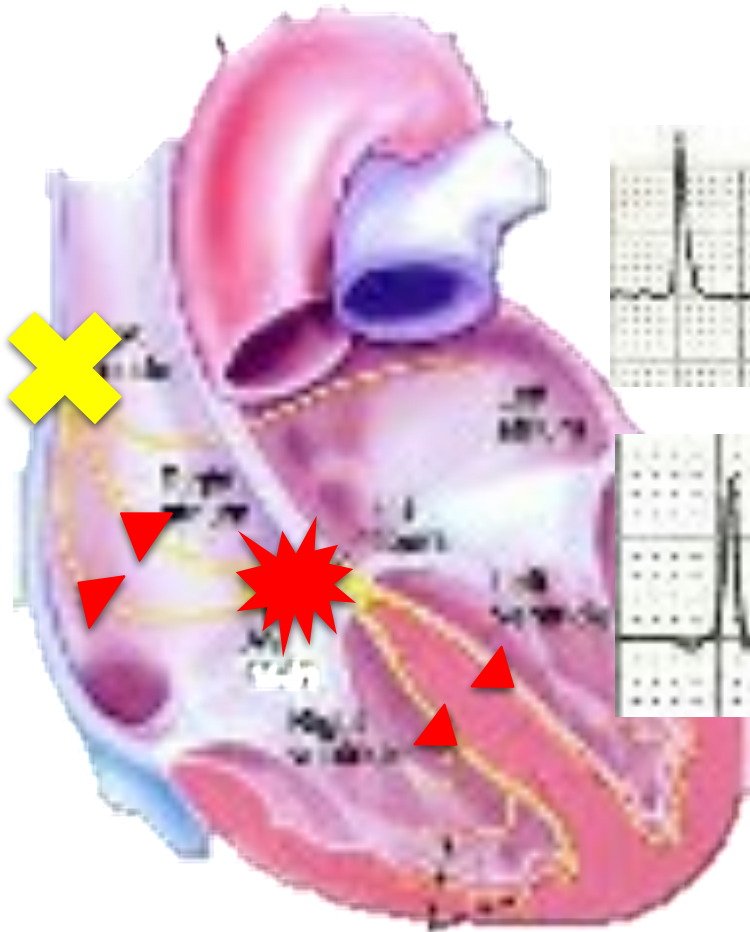


(50 beats/minute)

AV Nodal (Junctional) Rhythm

AV Nodal Rhythm

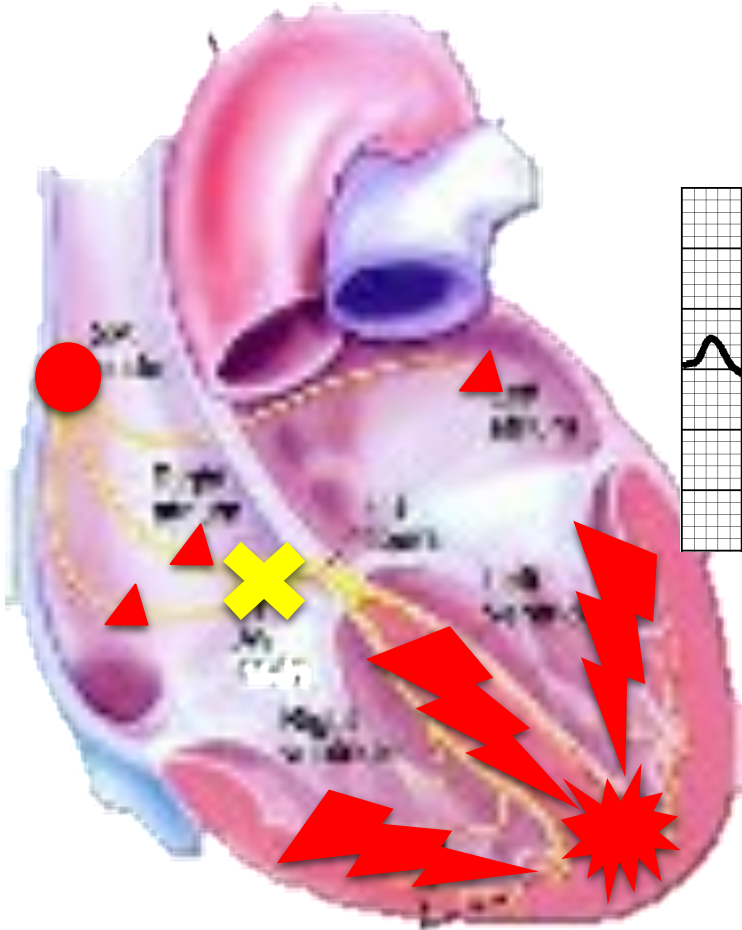
QRS has normal shape



(40- 50 beats/minute)

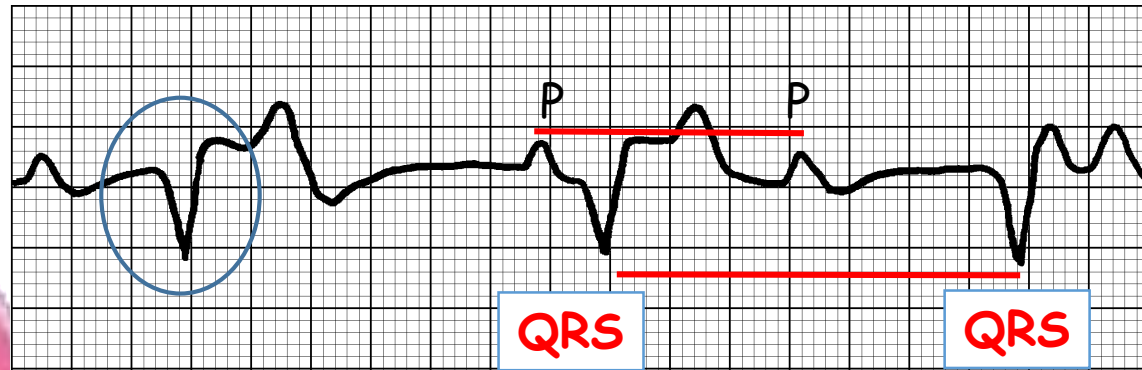
Idioventricular Rhythm

IVR



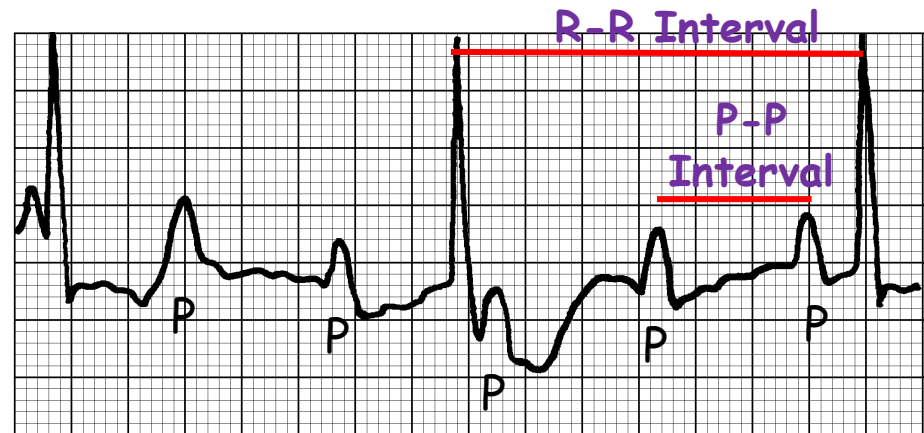
(30 beats/minute)

Wide QRS Complexes

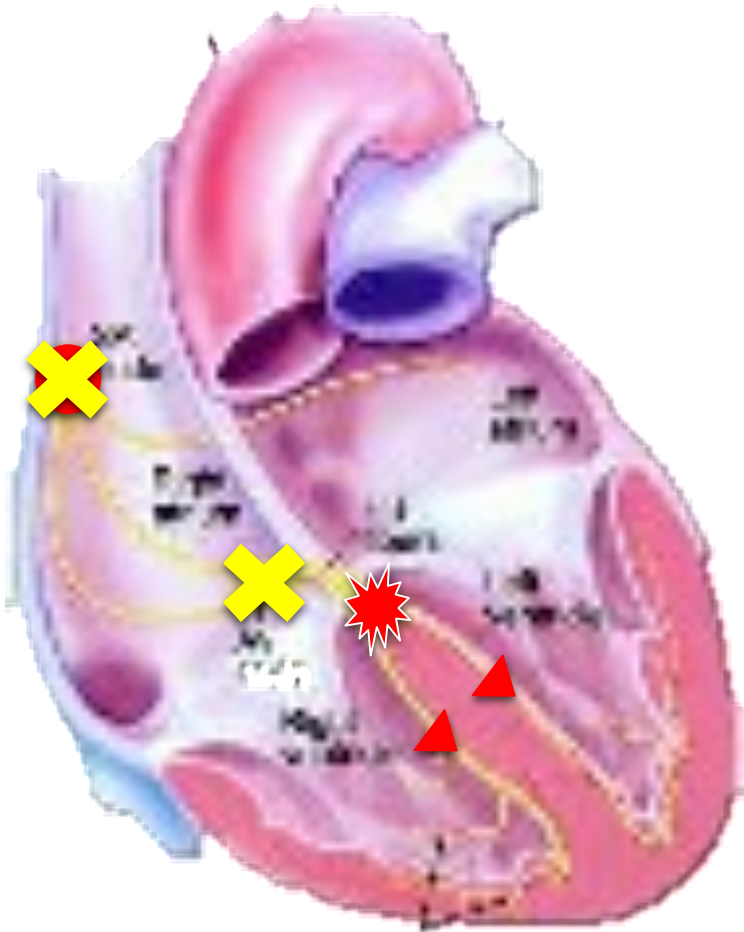


P-P Intervals are different from R-R Intervals

If the focus that controls the heart in CHB was **just below** the AVN



CHB WITH NARROW QRS COMPLEXES



Note

Sick Sinus Syndrome SSS



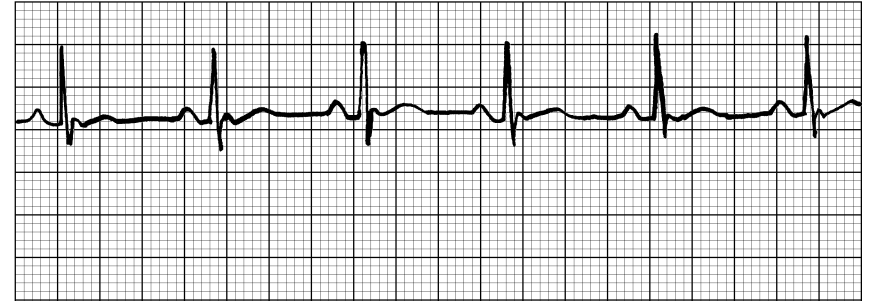
Tachycardia

Bradycardia

**Let us revise
the Heart
Rate
together**



Heart Rate



Normal ECG

Heart Rate



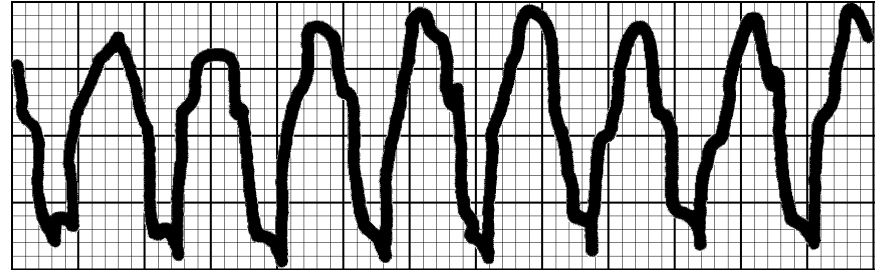
**Sinus
Tachycardia**

Heart Rate



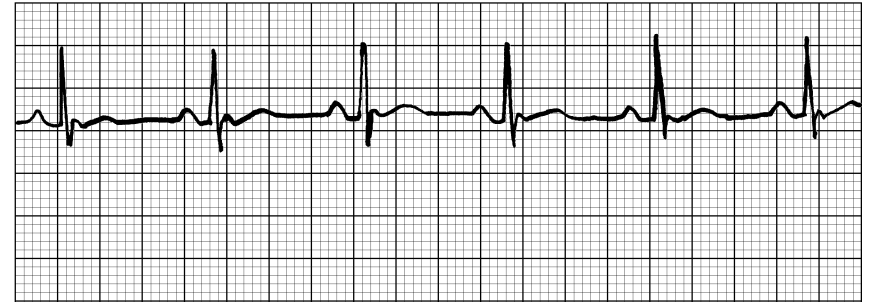
SVT

Heart Rate



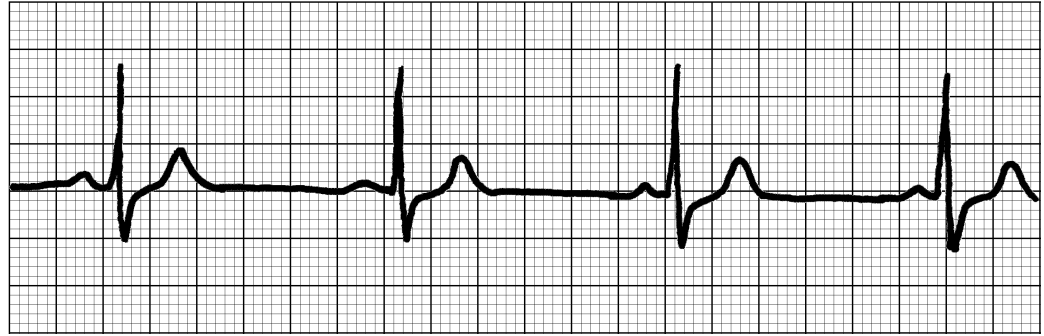
VT

Heart Rate



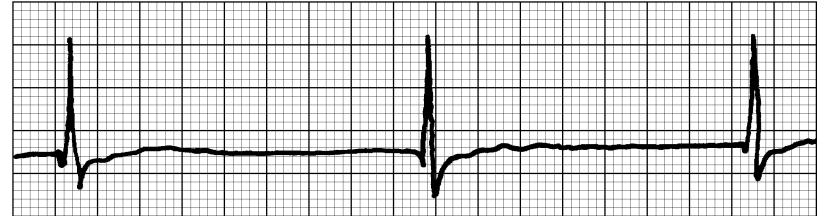
Normal ECG

Heart Rate



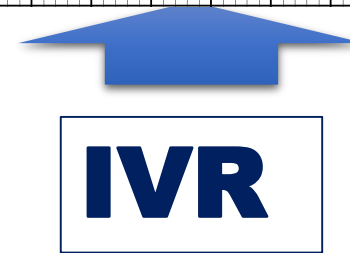
**Sinus
Bradycardia**

Heart Rate



**AV Nodal
Rhythm**

Heart Rate



Test Yourself

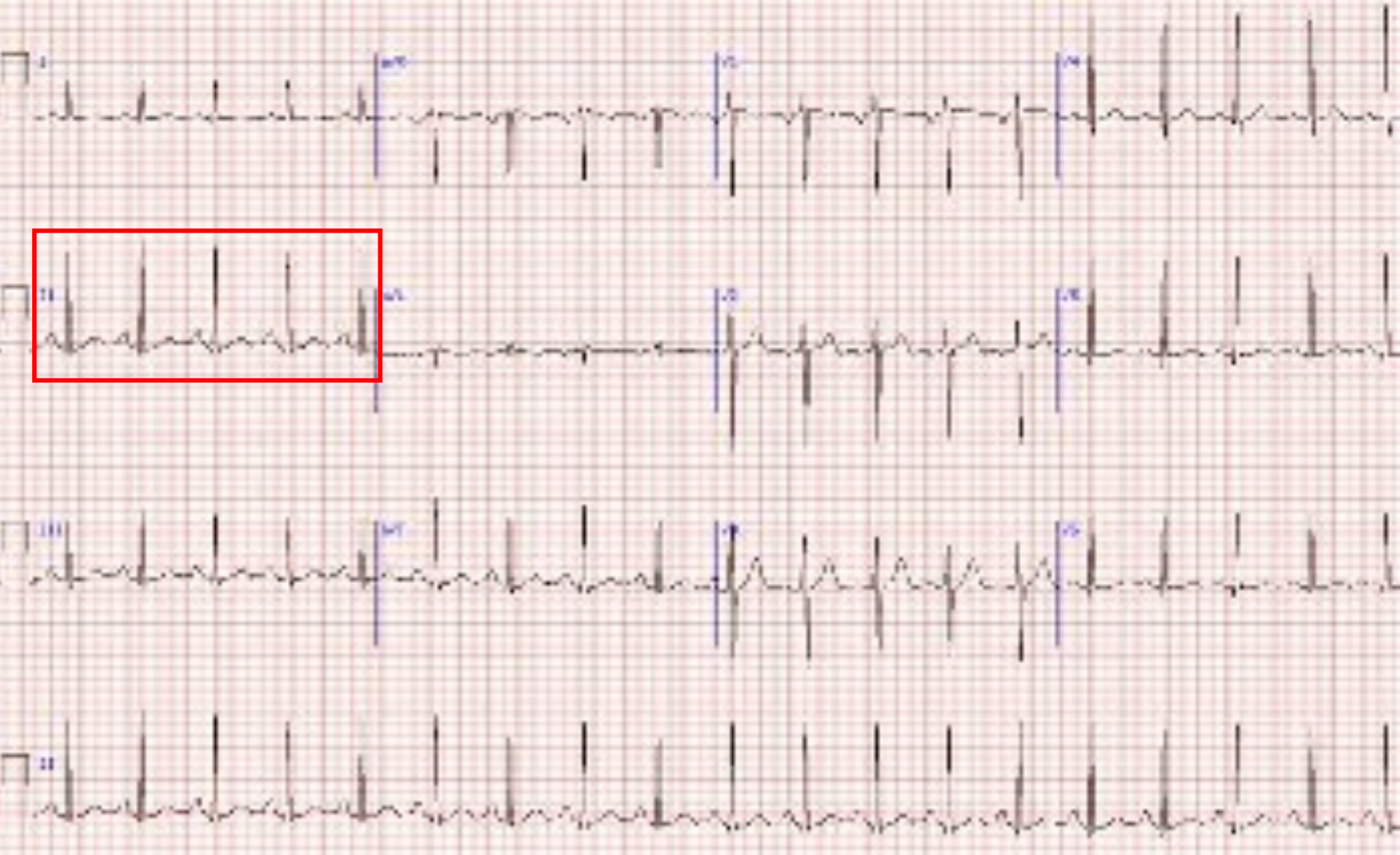


Comment on the Heart Rate

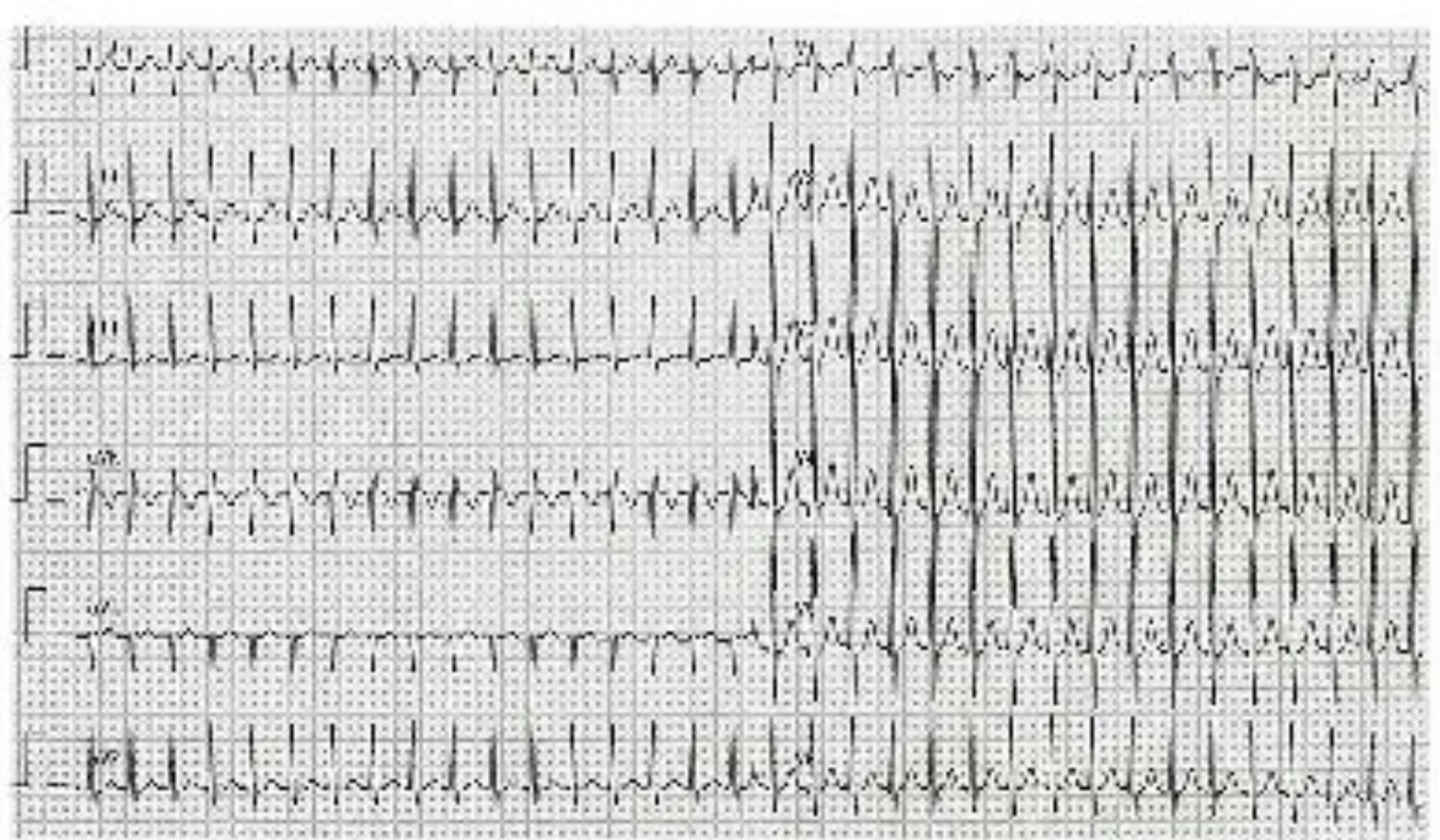




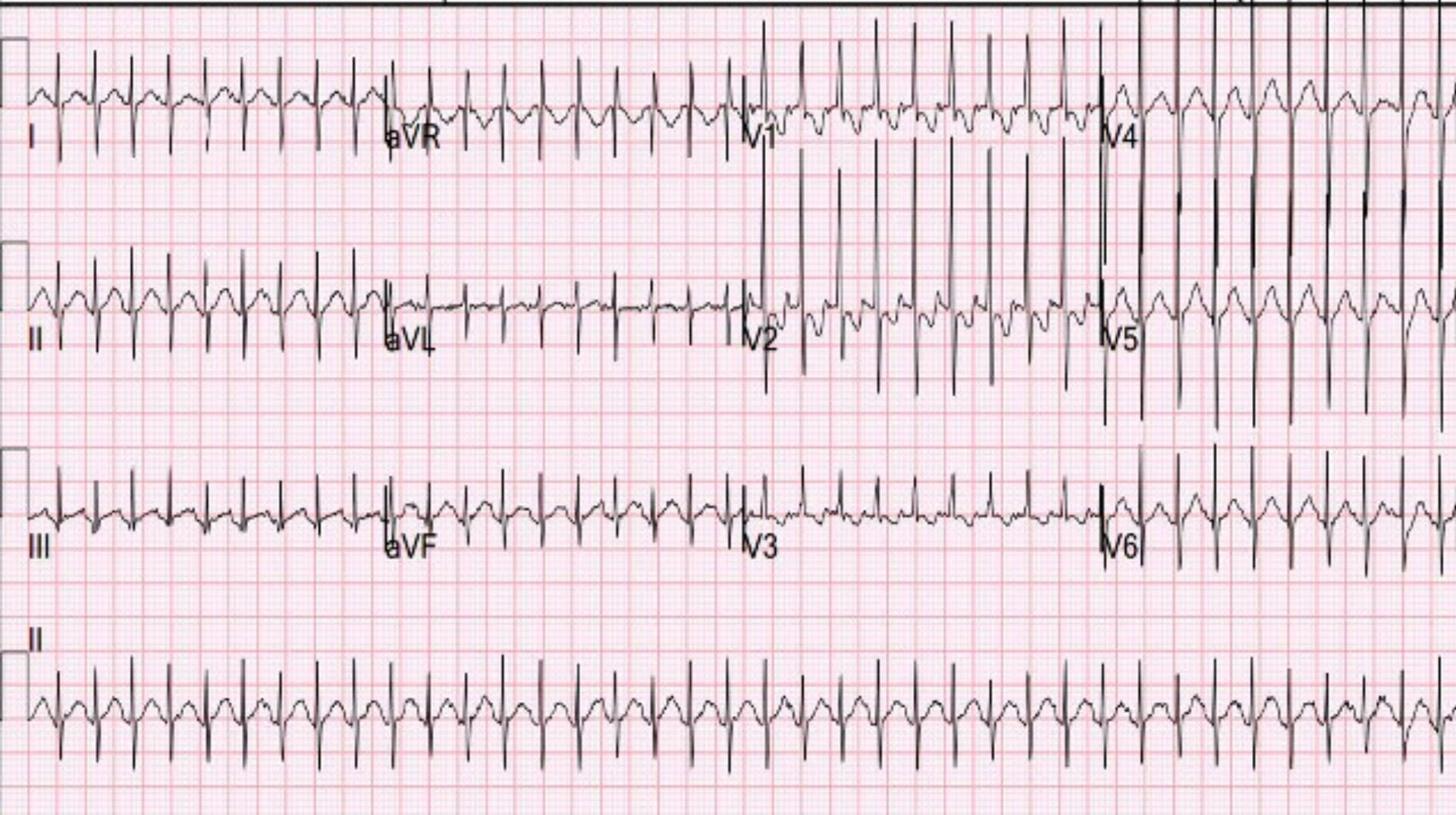
- 1 Sinus Tachycardia
- 2 SVT
- 3 VT



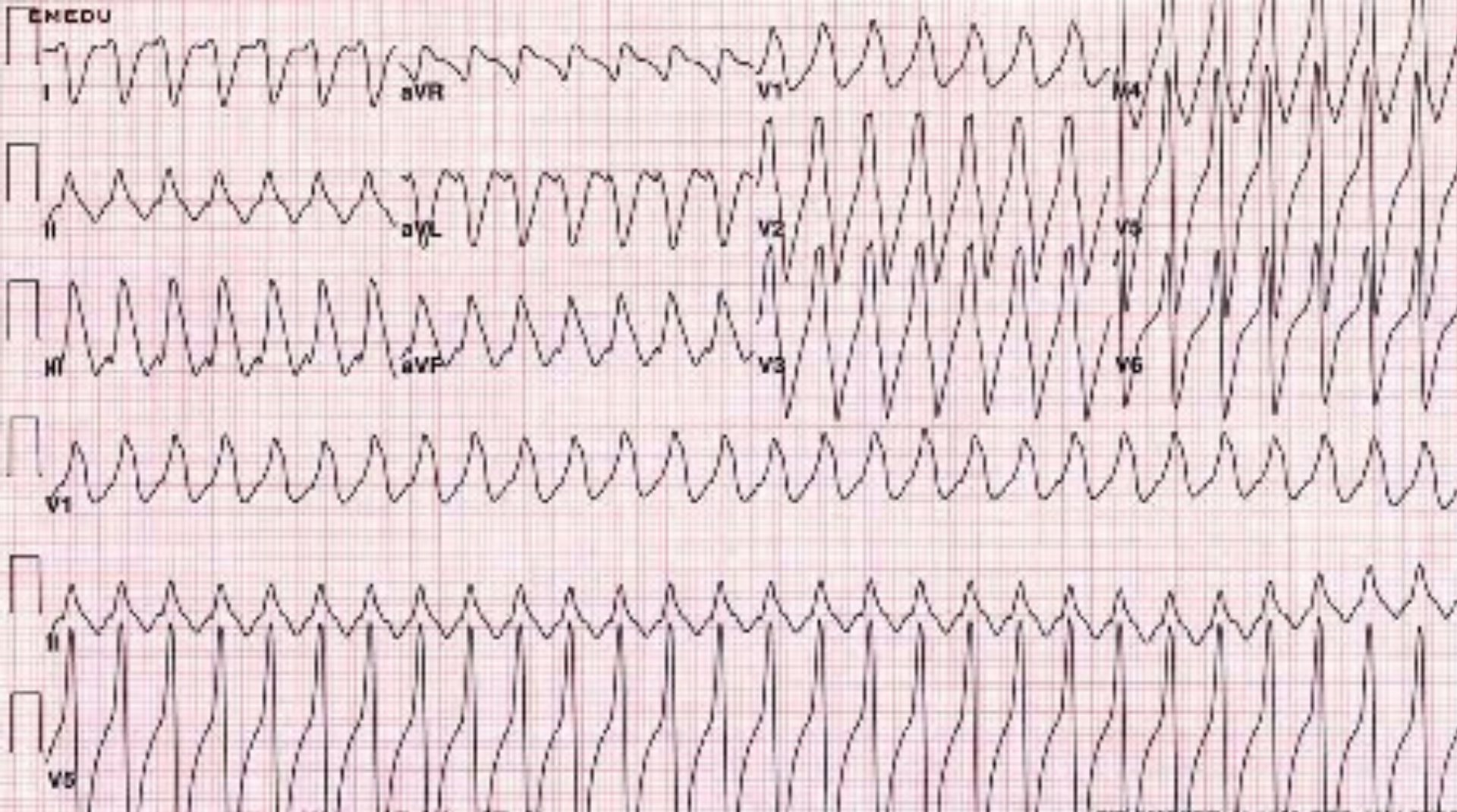
- 1 Sinus Tachycardia
- 2 SVT
- 3 VT



- 1 Sinus Tachycardia
- 2 SVT
- 3 VT



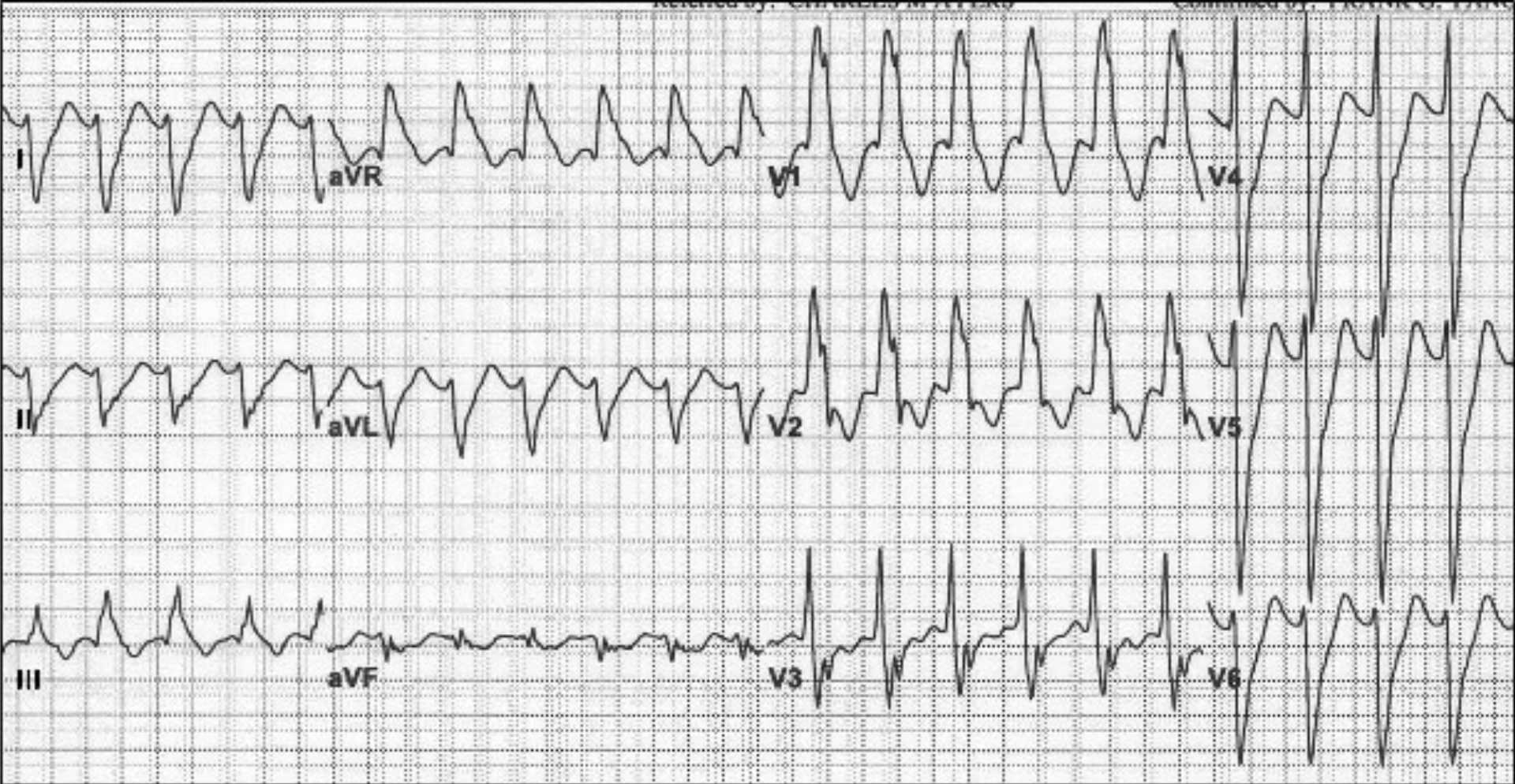
- ① Sinus Tachycardia
- ② SVT
- ③ VT



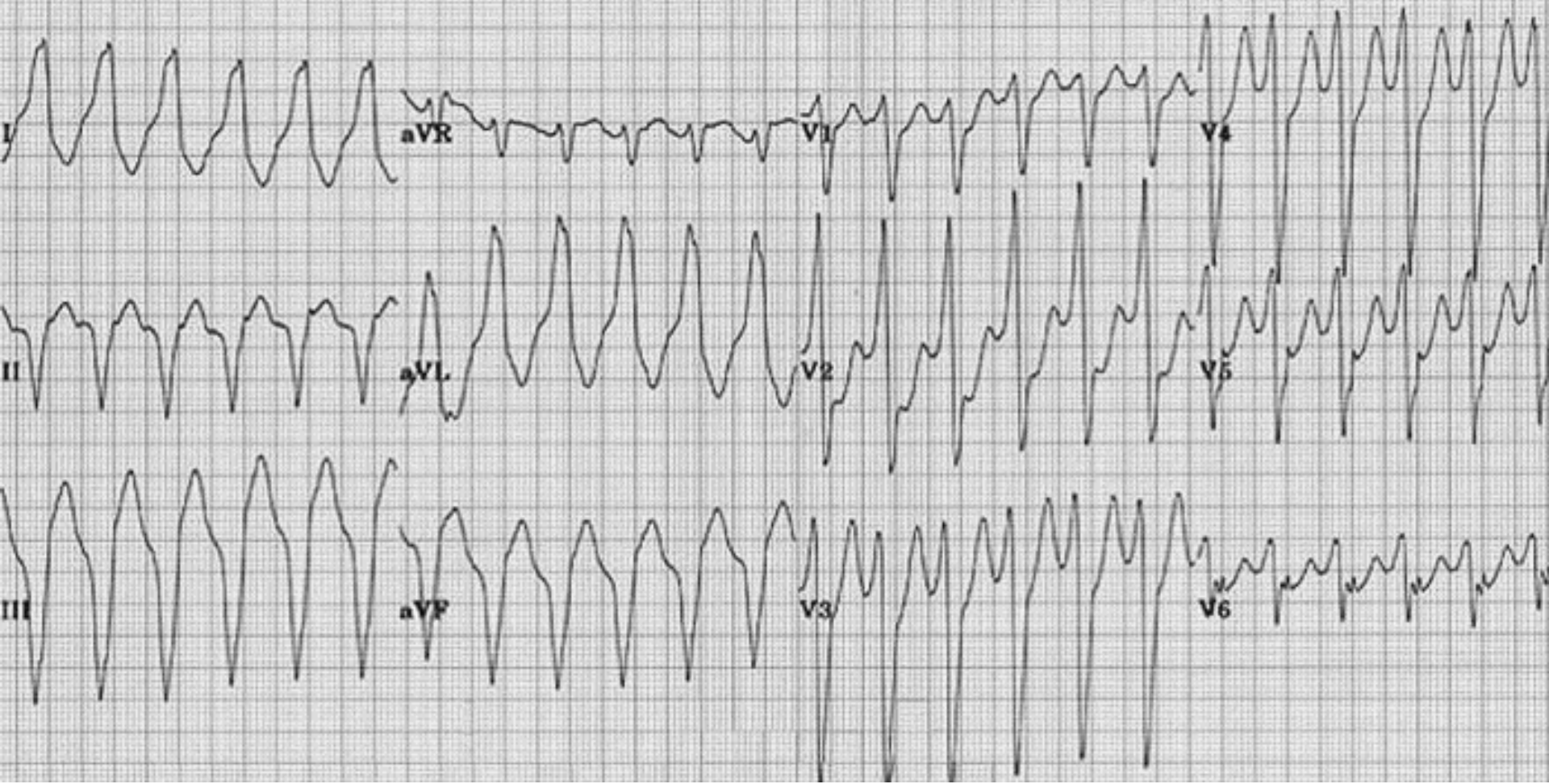
1 Sinus Tachycardia

2 SVT

3 VT



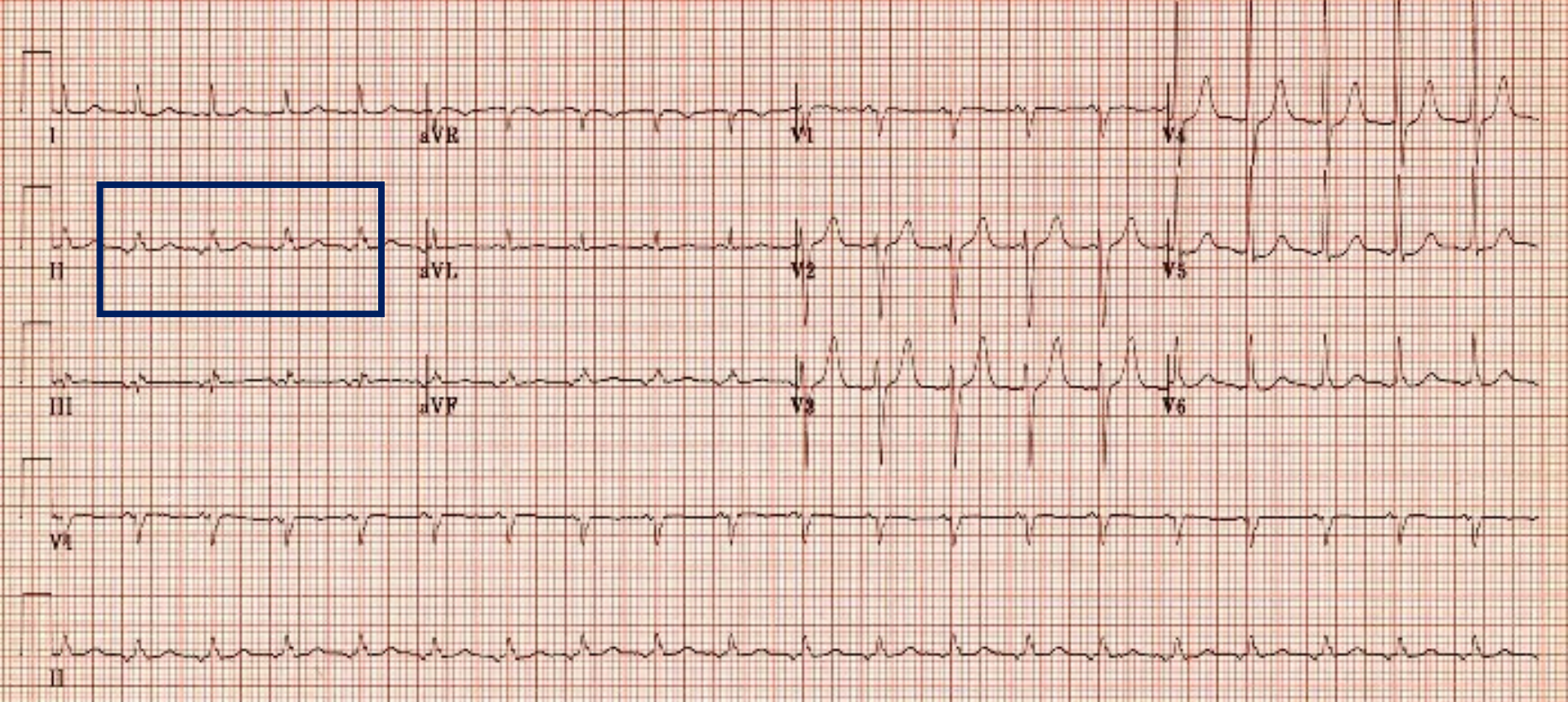
- 1 Sinus Tachycardia
- 2 SVT
- 3 VT



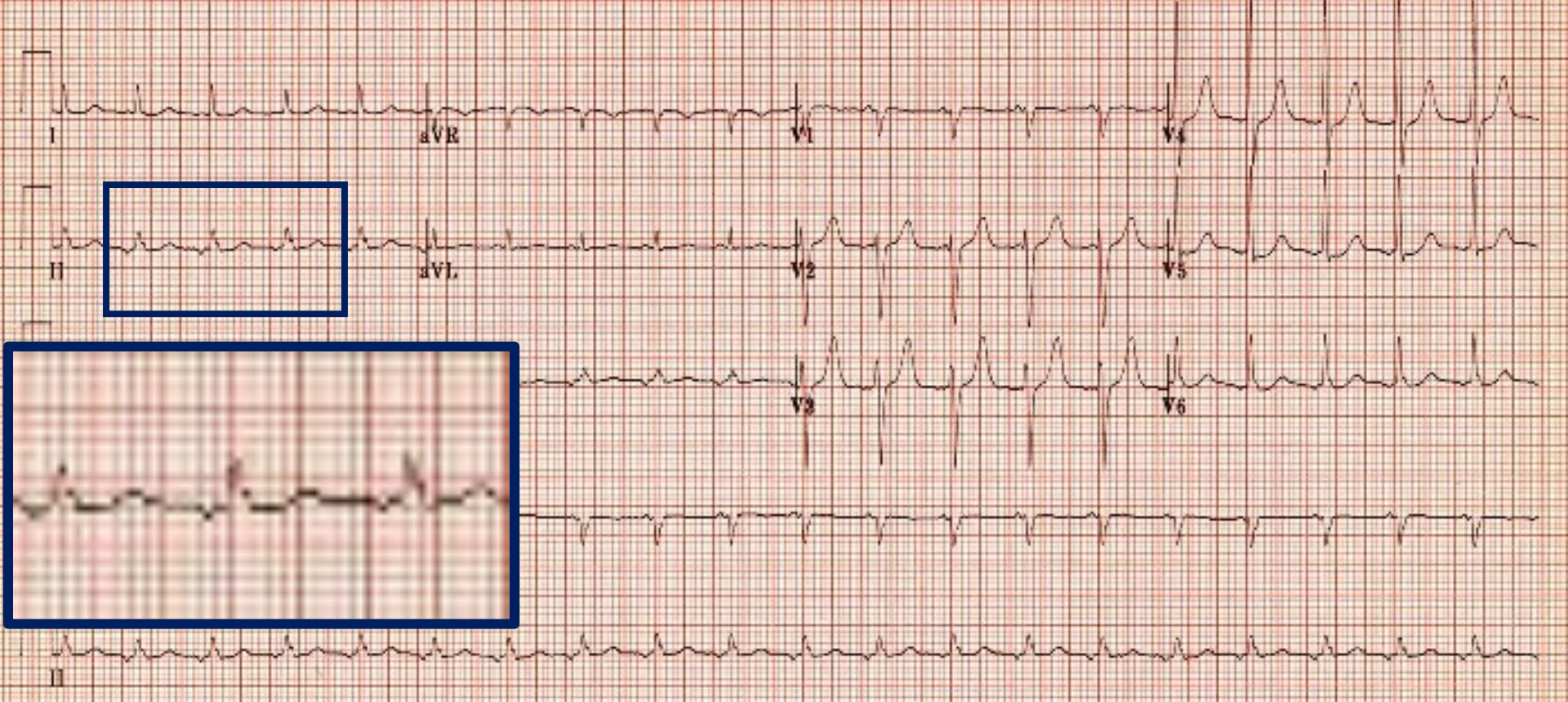
- 1 Sinus Tachycardia
- 2 SVT
- 3 VT



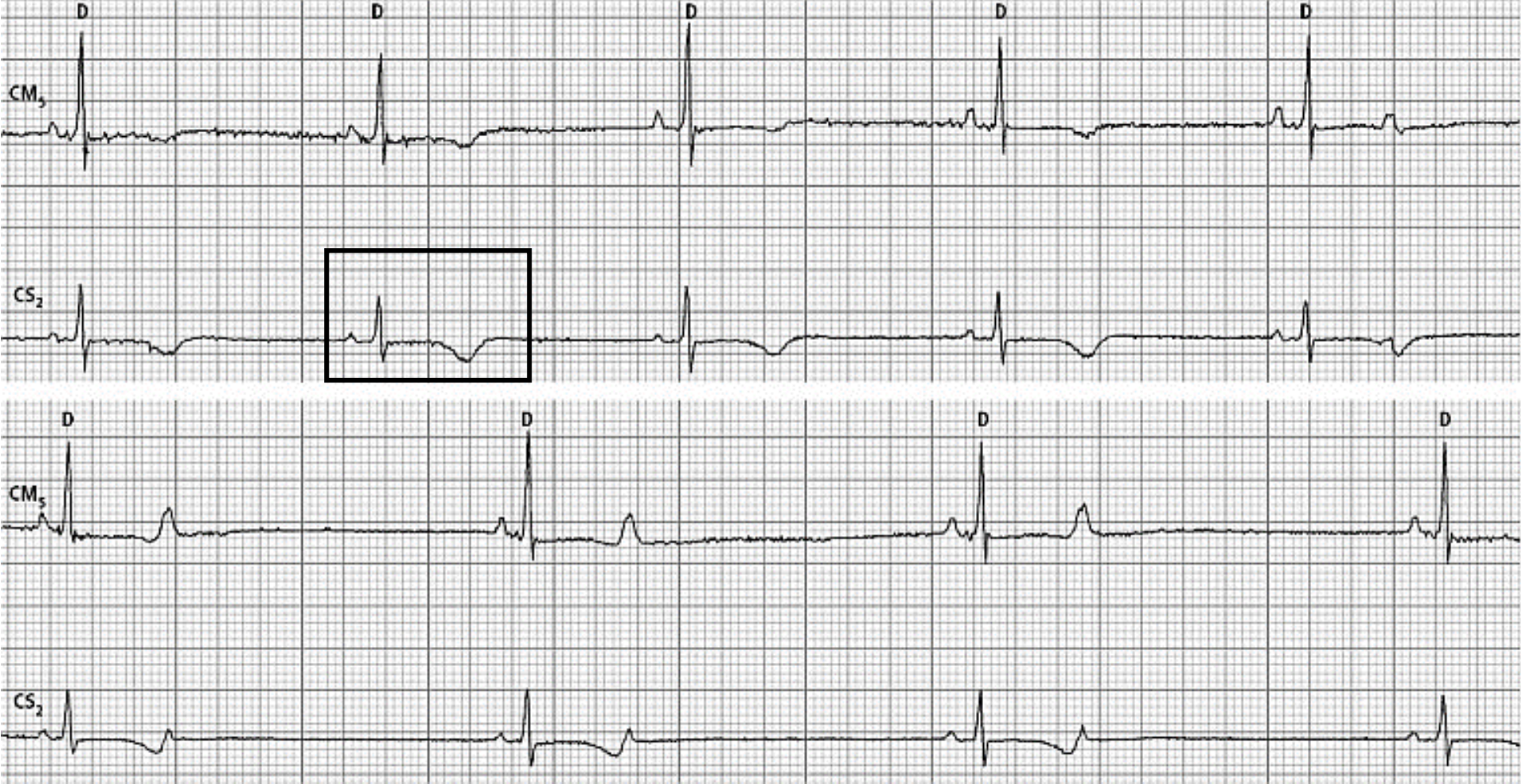
- 1 Sinus Tachycardia
- 2 SVT
- 3 VT



- 1 Sinus Tachycardia
- 2 SVT (Nodal)
- 3 VT

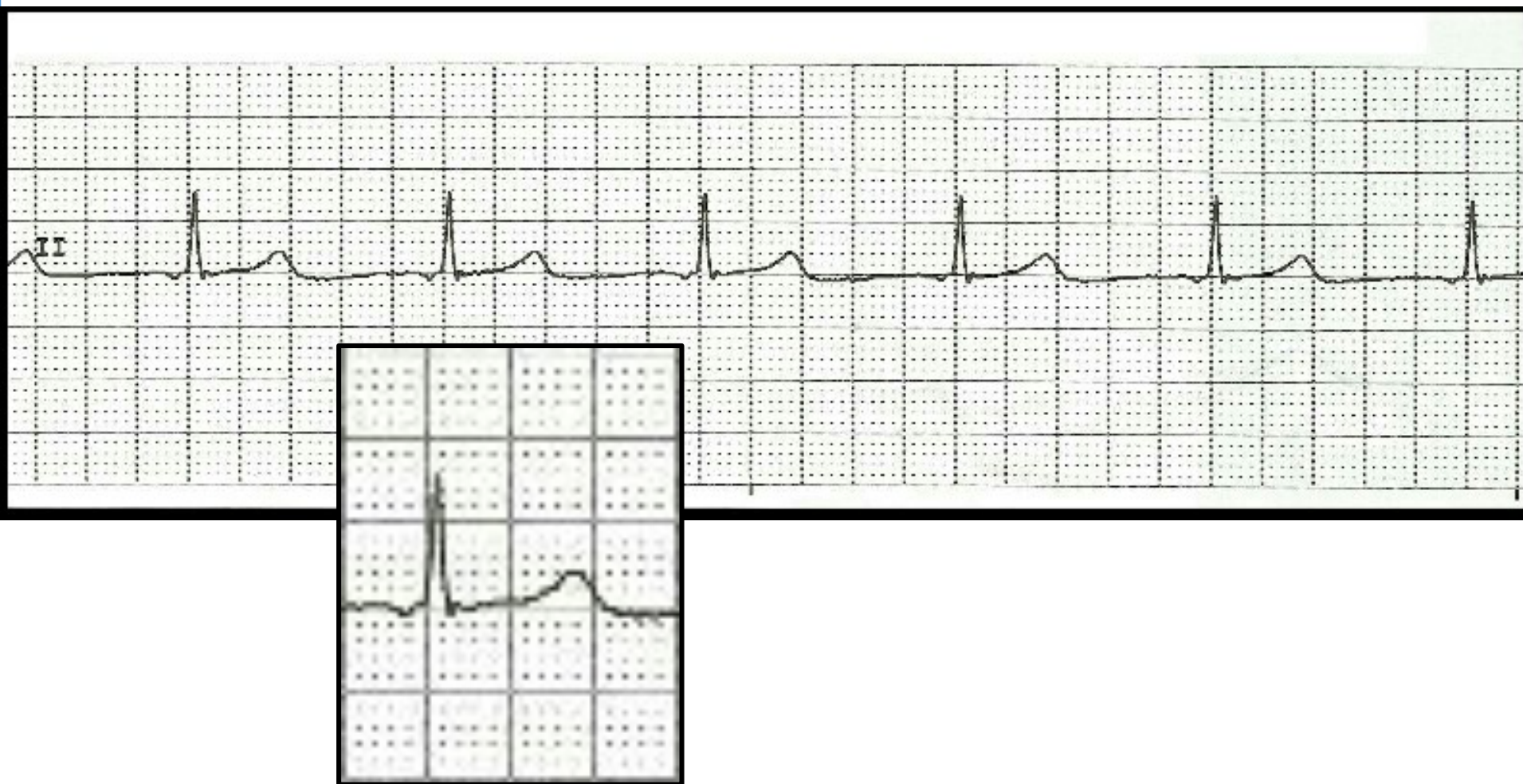


- 1 Sinus Tachycardia
- 2 SVT (Nodal)
- 3 VT



- 1 Sinus Bradycardia
- 2 AV Nodal Rhythm
- 3 IVR

How do you describe the Bradycardia (below)?



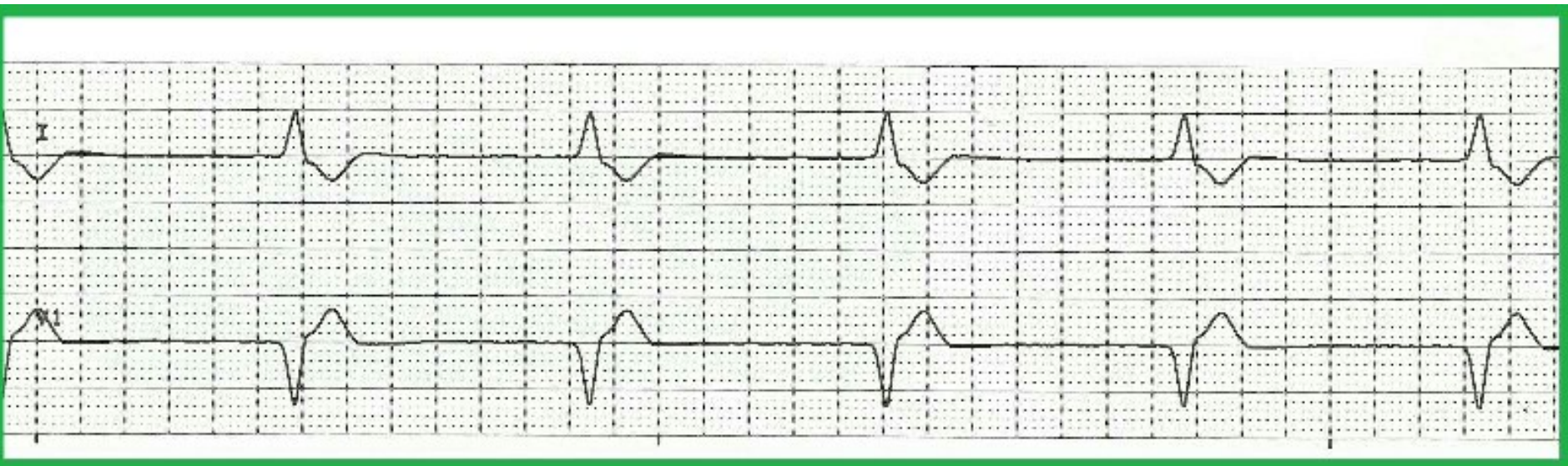
- 1 Sinus Bradycardia
- 2 AV Nodal Rhythm
- 3 IVR



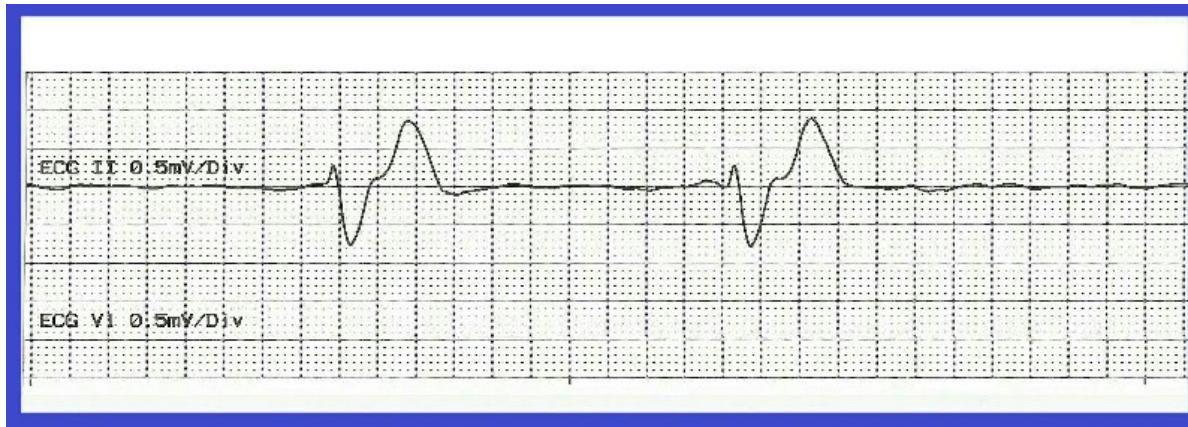
- 1 Sinus Bradycardia
- 2 AV Nodal (Junctional) Rhythm
- 3 IVR



- 1 Sinus Bradycardia
- 2 AV Nodal (Junctional) Rhythm
- 3 **IVR**



- ① Sinus Bradycardia
- ② AV Nodal (Junctional) Rhythm
- ③ **IVR**



- 1 Sinus Bradycardia
- 2 AV Nodal (Junctional) Rhythm
- 3 **IVR**

Cardiac Axis

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

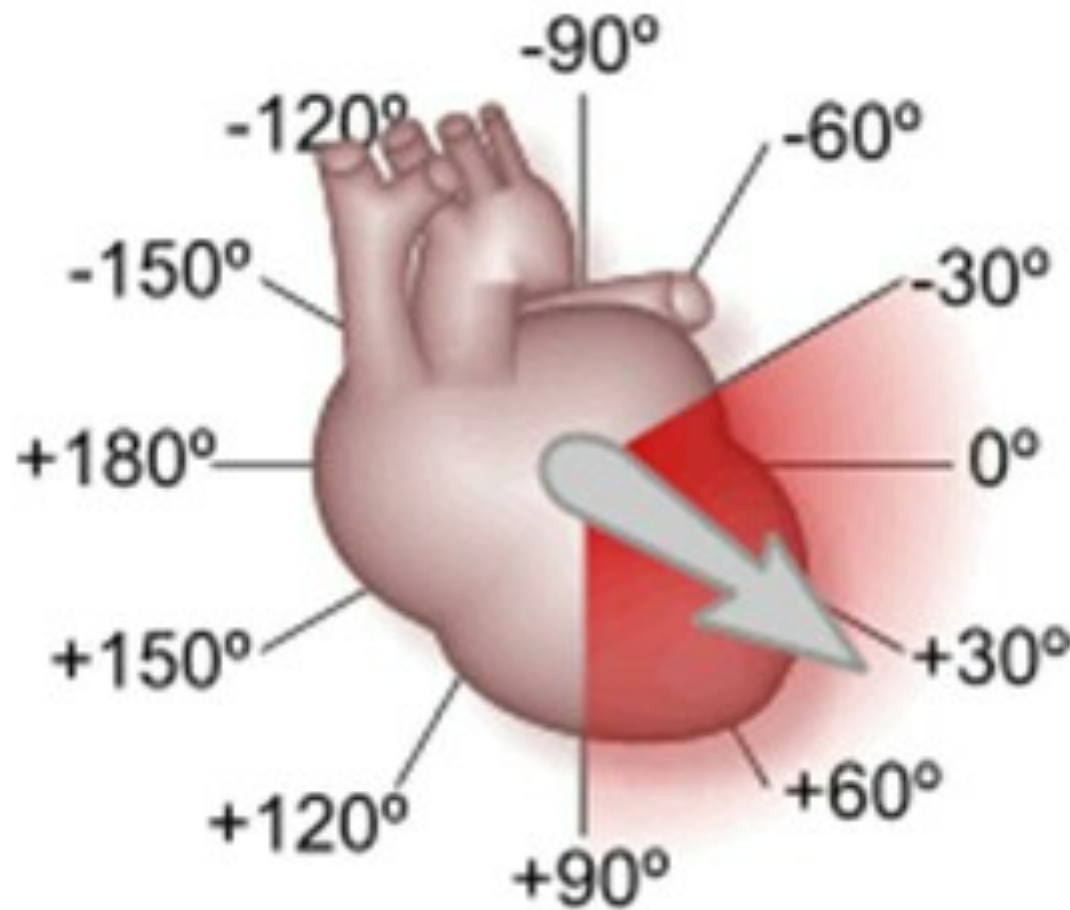
**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في هذا الموقع هم
تحت حماية قانون الملكية الفكرية و لا يحق لأحد إستخدامه أو إستنساخه أو
تحميله على أى كمبيوتر أو إعادة طبعه أو طبع أجزاء منه بدون إذن مسبق من
الدكتور طارق عبد الحميد (أو من ينوب عنه قانونياً) . و من يتعدى على
الملكية الفكرية المذكورة فسوف يتعرض للمسائلة القضائية عن جريمة إنتهاك
حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول
فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص برجاء
الإتصال بالدكتور طارق عبد الحميد

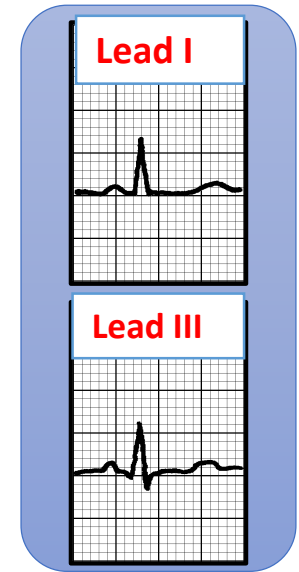
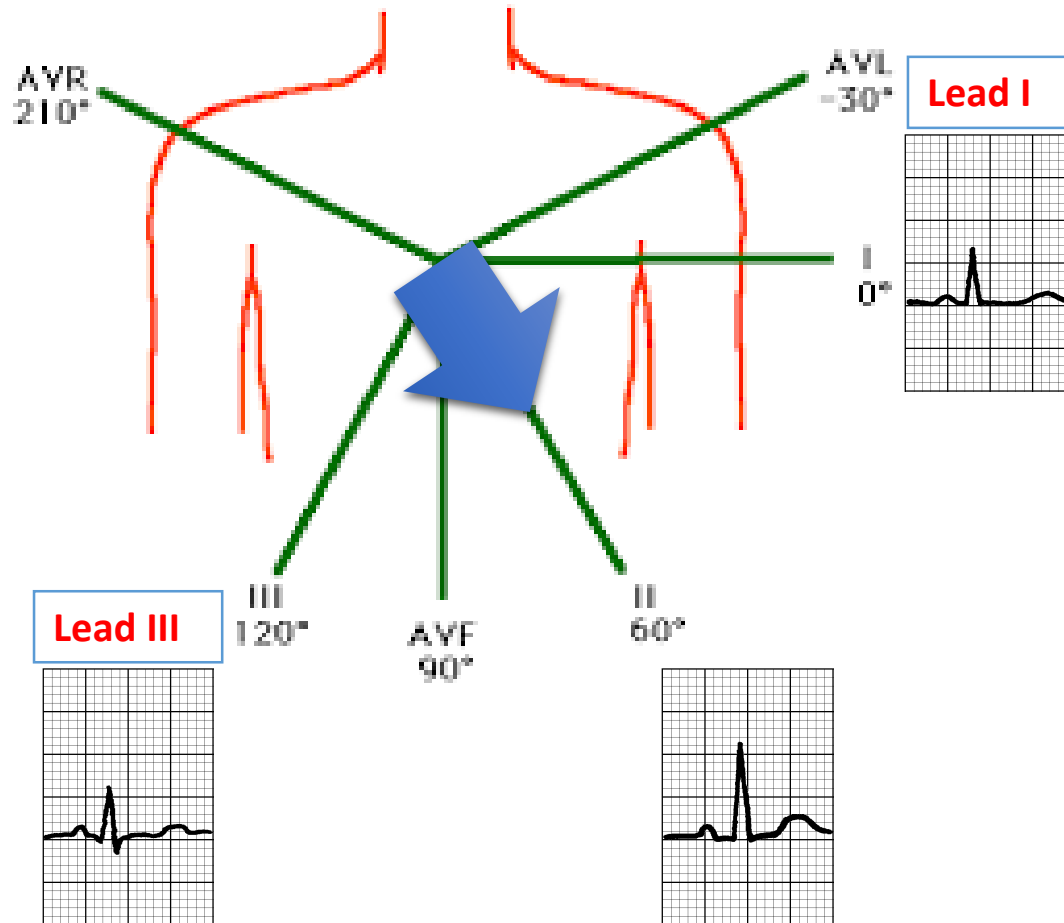




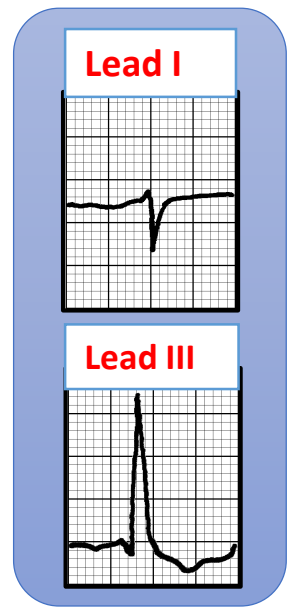
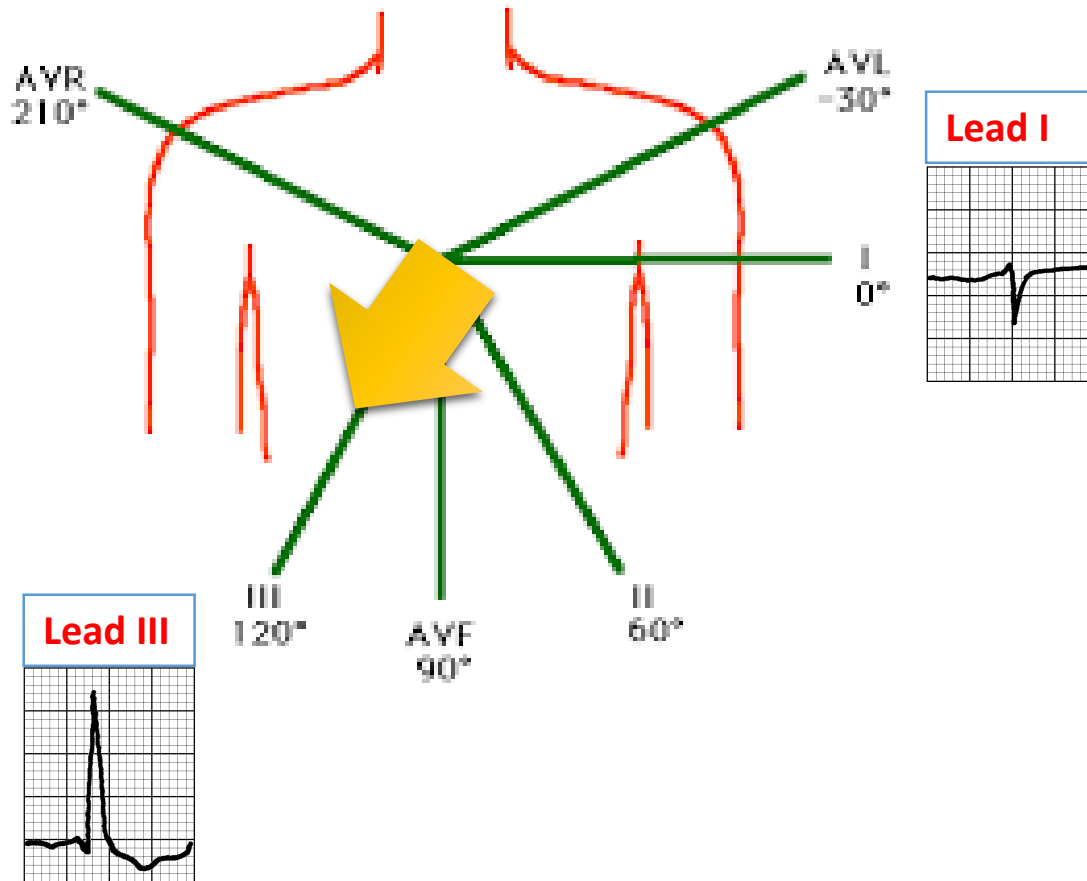
Direction of Normal Cardiac Axis



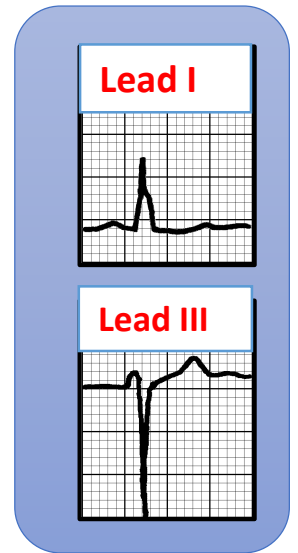
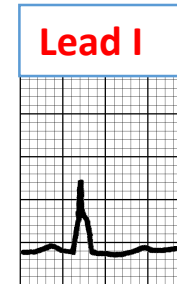
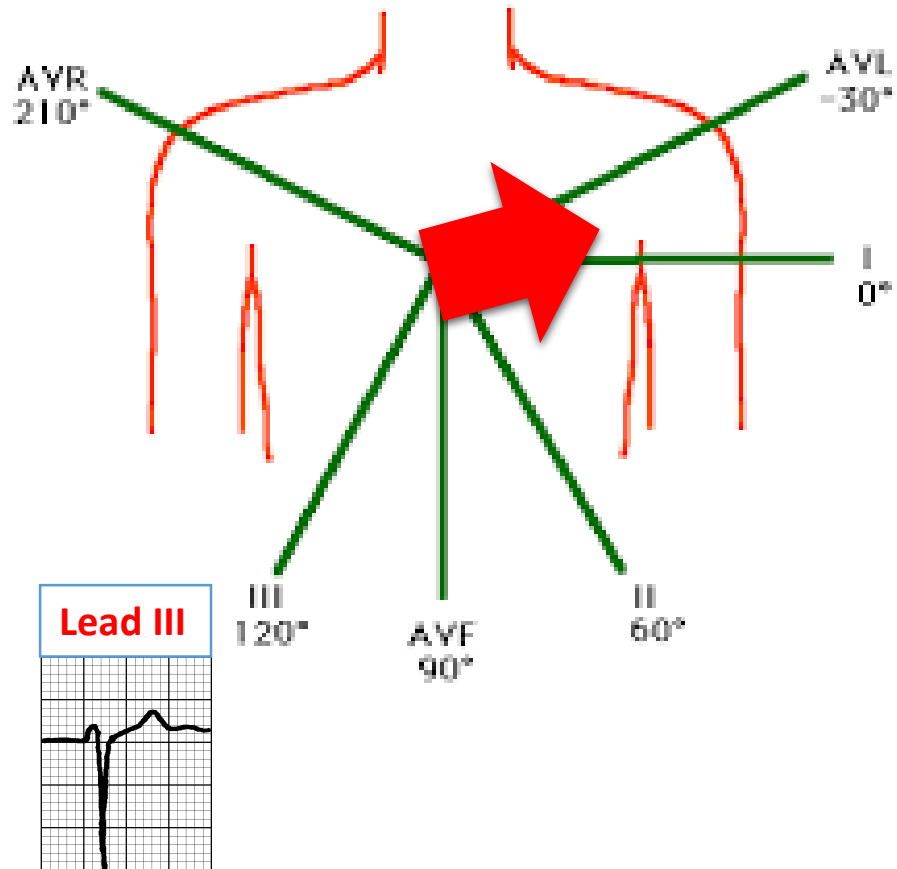
Normal axis



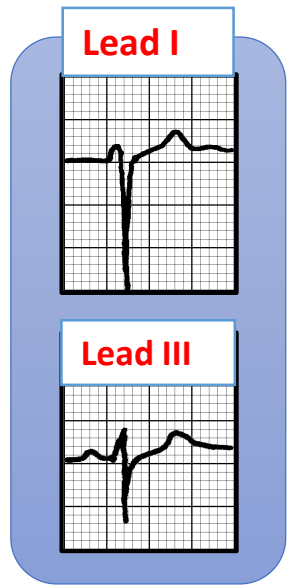
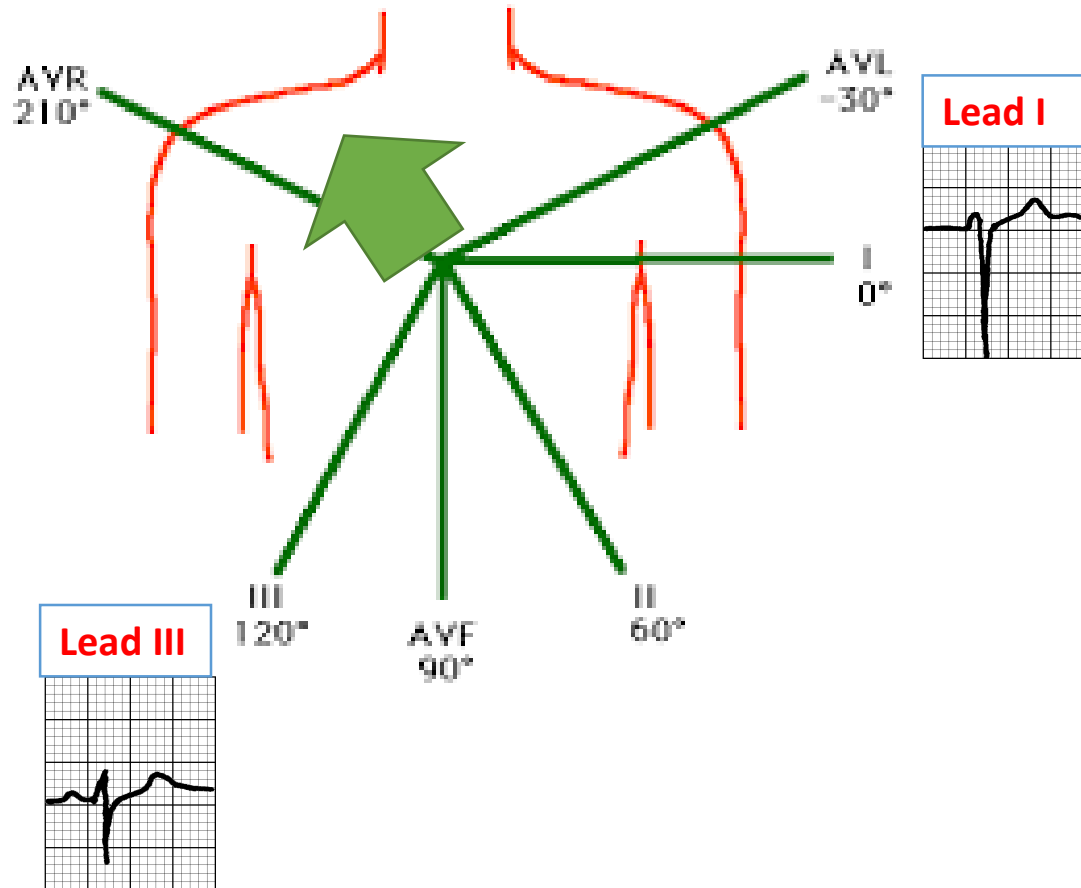
RAD



LAD



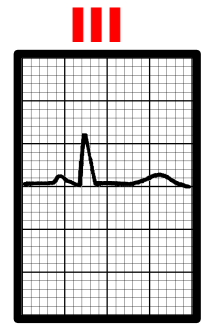
NML



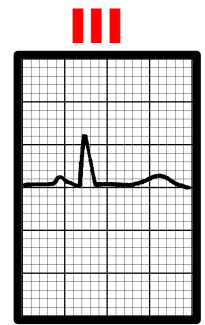
Let us revise the Cardiac Axis



Cardiac Axis



Cardiac Axis

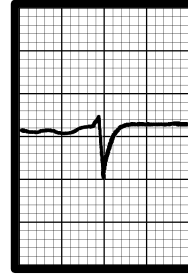


**Normal
heart**

Cardiac Axis



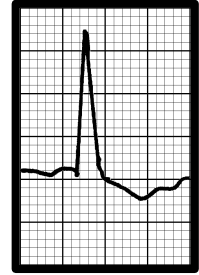
I



II



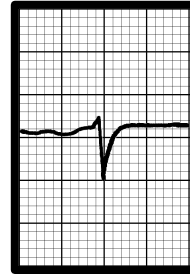
III



Cardiac Axis



I



II



III



RAD

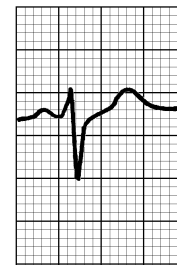
Cardiac Axis



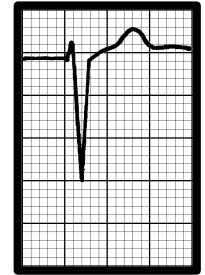
I



II



III



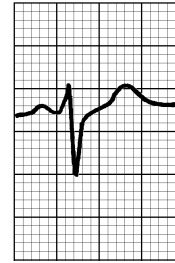
Cardiac Axis



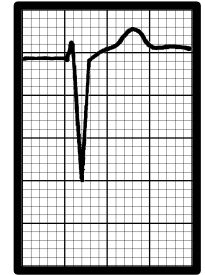
I



II



III



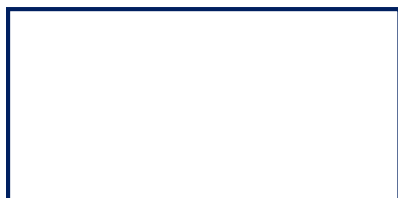
LAD

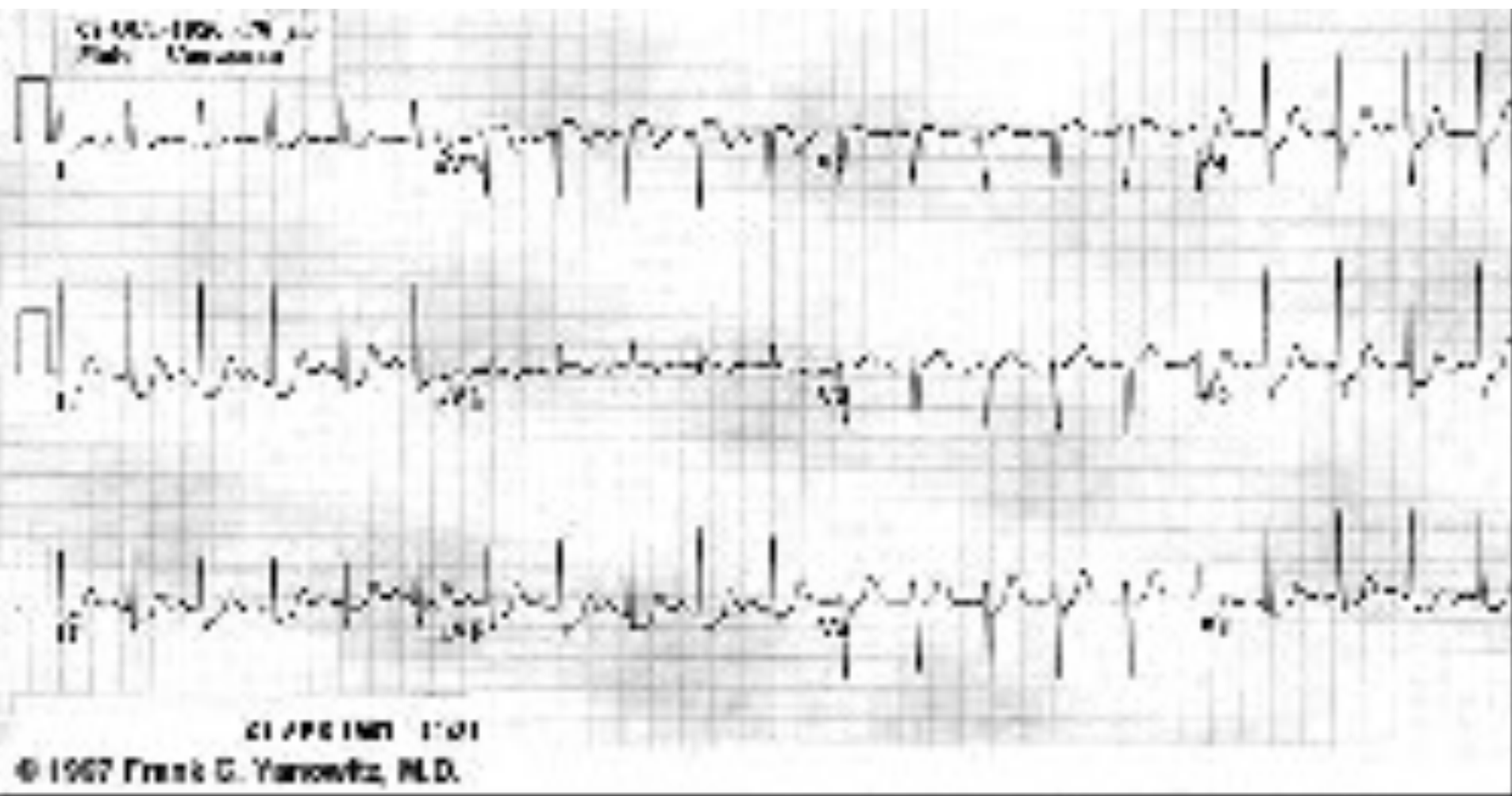
CI 400-100-100
Poly-Carbonate



CI 400-100-100

© 1967 Frank G. Yarrowitz, M.D.

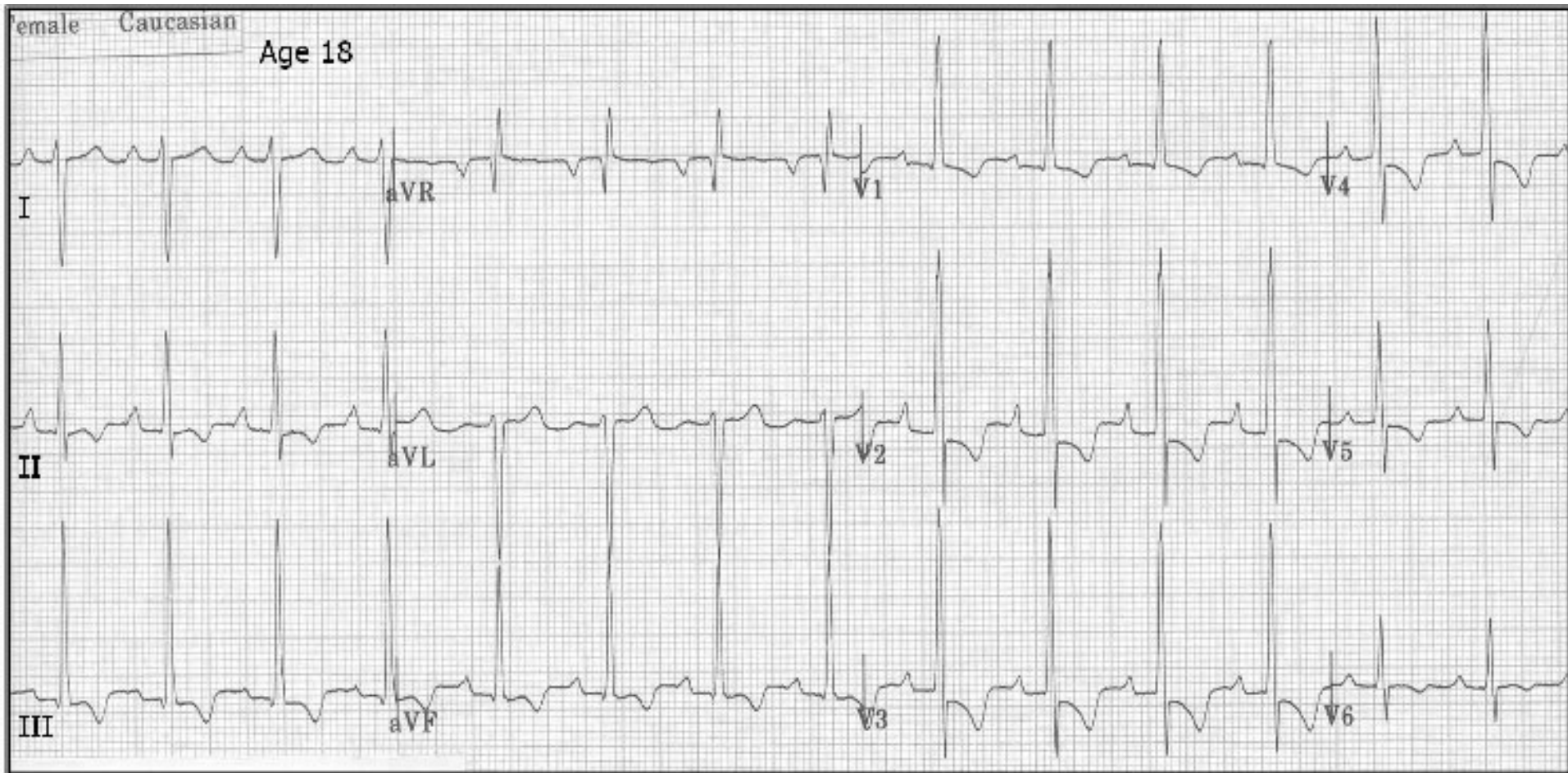




Normal

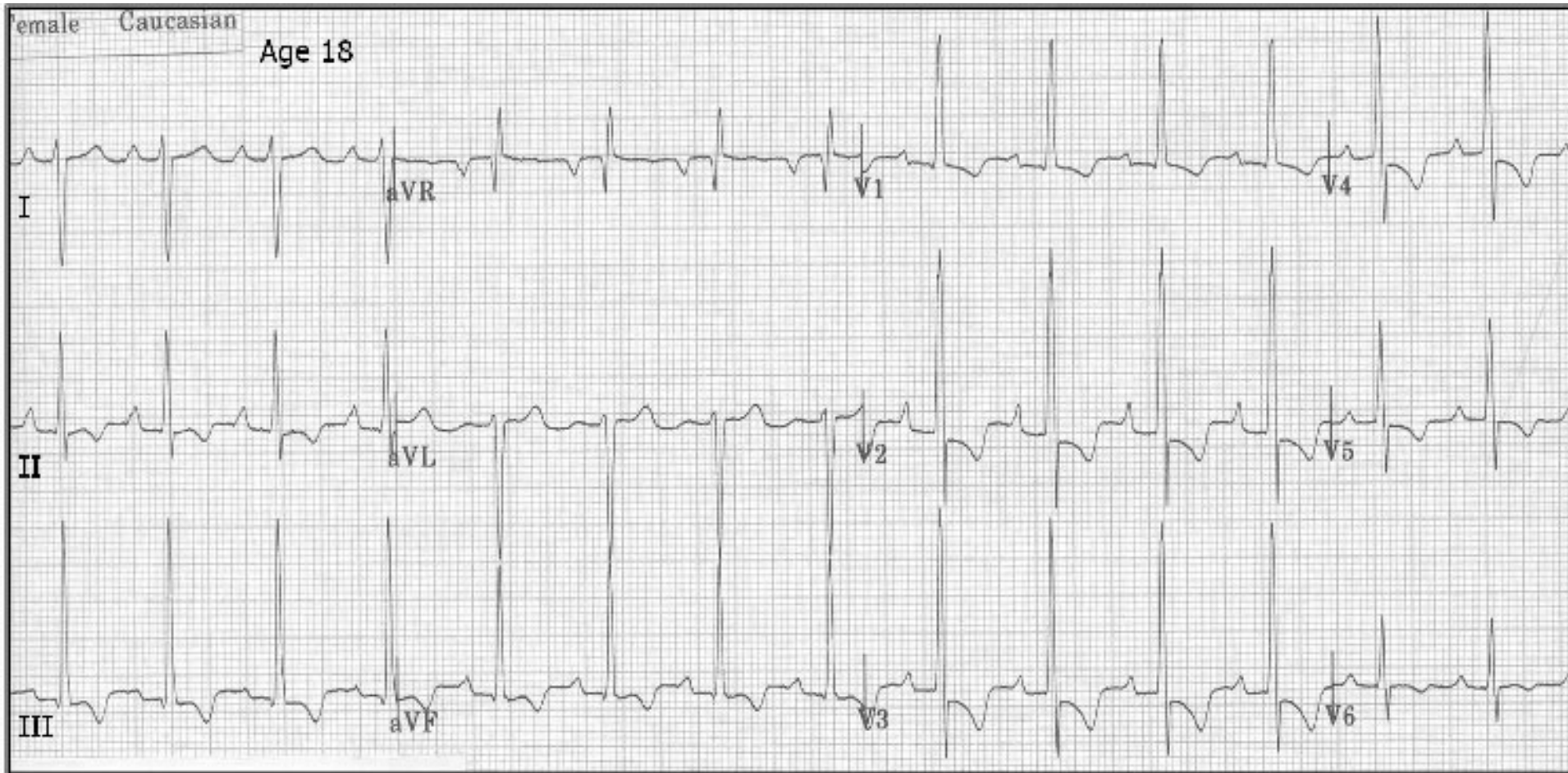
Female Caucasian

Age 18

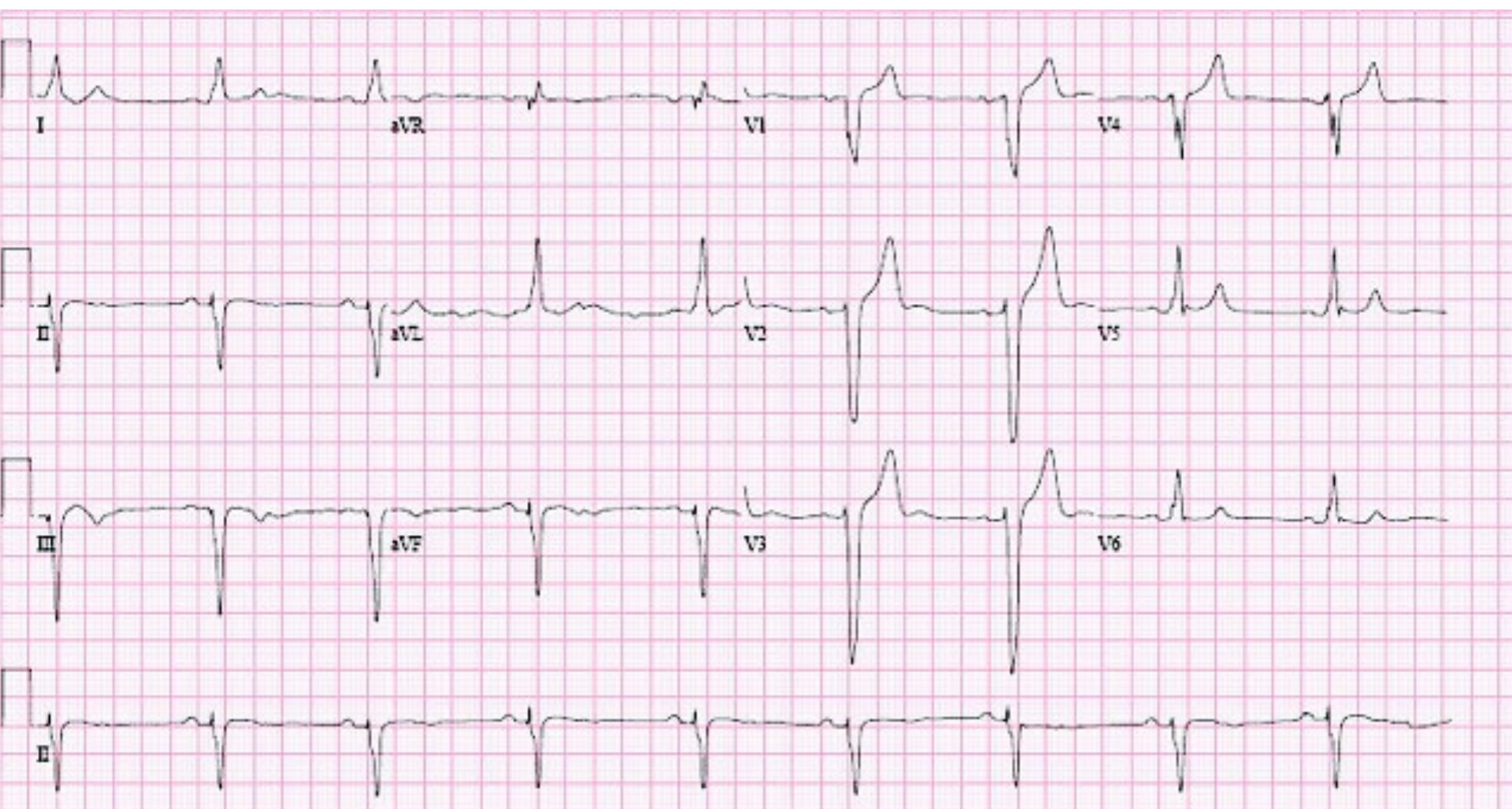


Female Caucasian

Age 18



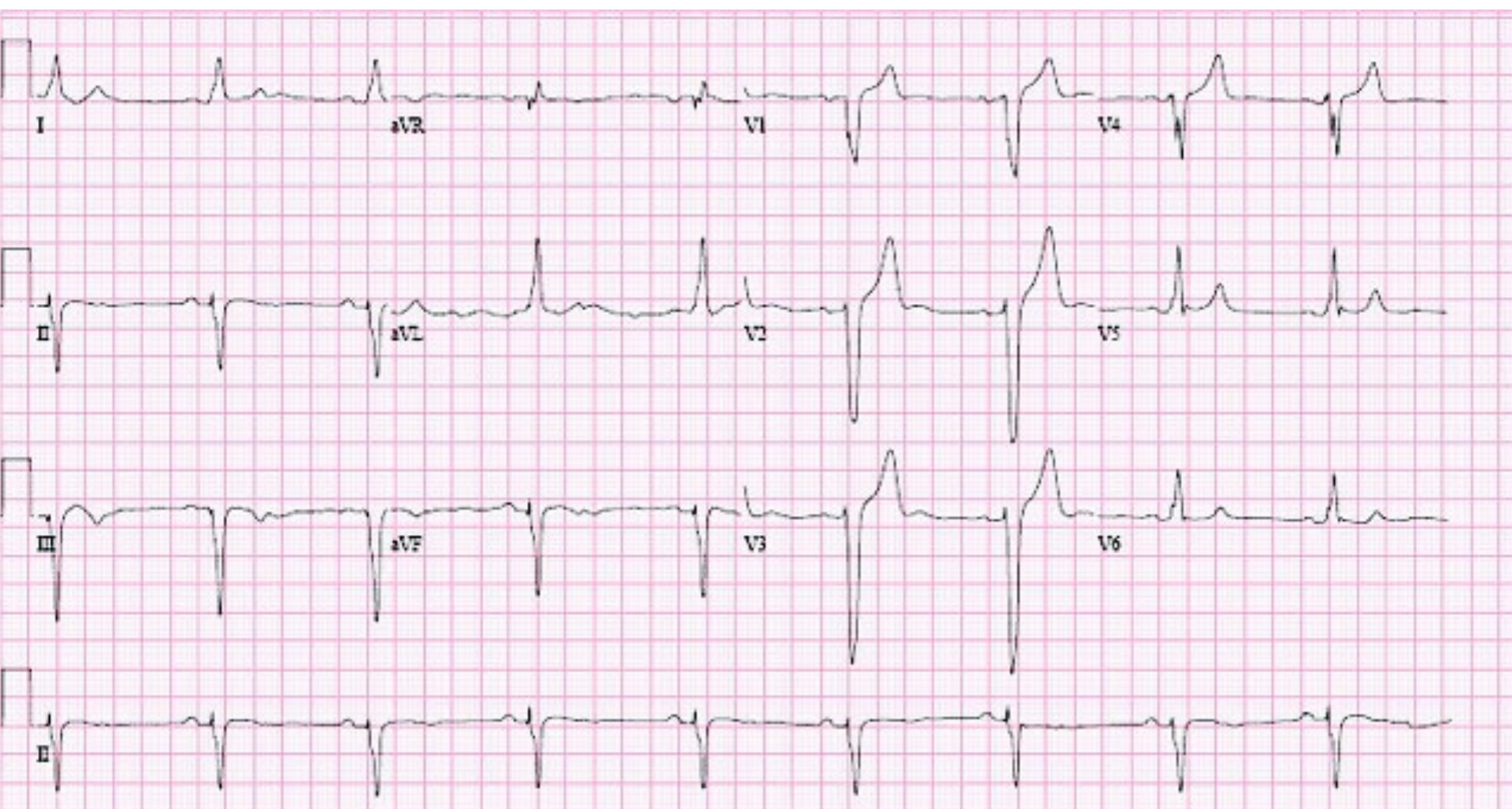
RAD



25mm/s 10mm/mV 100Hz 005C 12SL 231 IDC-45

EID-214 EDT: 10:28 16-jun-2006 ORDRE:





25mm/s 10mm/mV 100Hz 005C 12SL 231 IDC-45

EID-214 EDT: 10:28 16-jun-2006 ORDRE:

LAD

Name:

ID:

Patient ID:

Incident:

Age: 85

12-Lead 1

PR 0.188s

QT/QTc

P-QRS-T Axes

Sex:

aVR

HR 137 bpm

85:25:16

QRS 0.164s

0.396s/0.597s

-42° 229° 42°

• Abnormal ECG ****Unconfirmed****

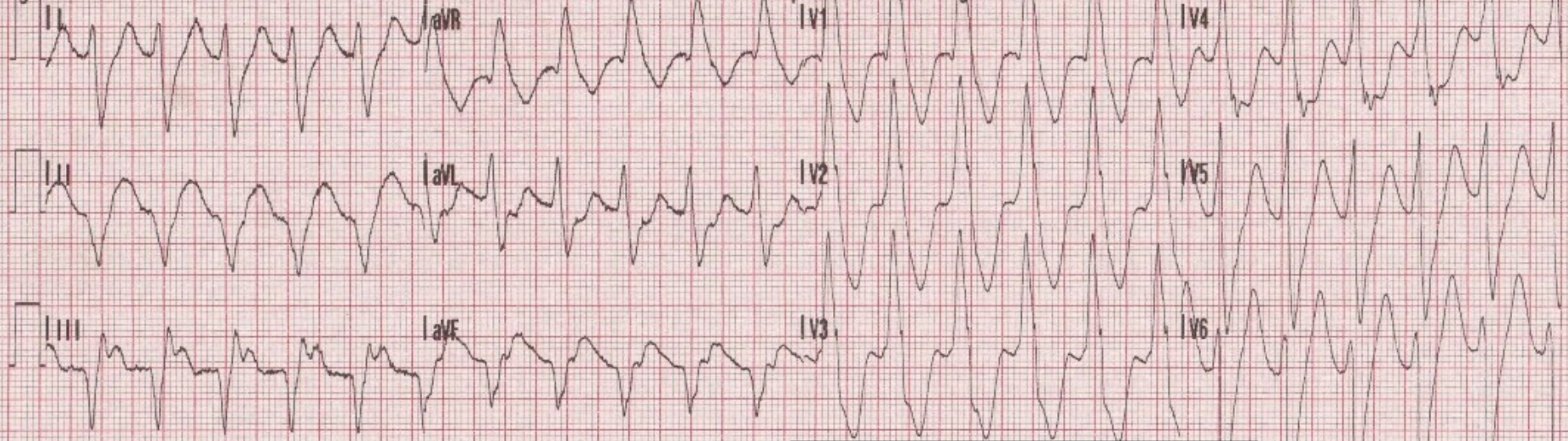
• Unusual P axis, possible ectopic atrial

tachycardia

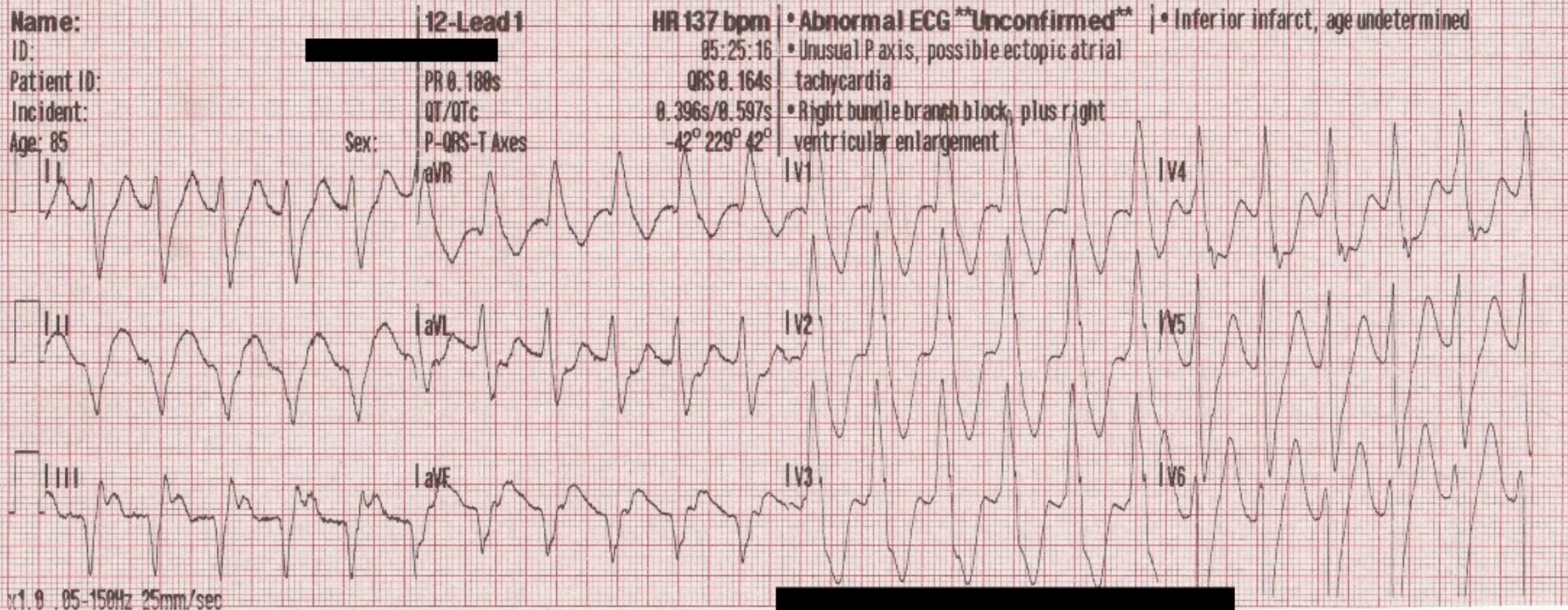
• Right bundle branch block, plus right

ventricular enlargement

• Inferior infarct, age undetermined

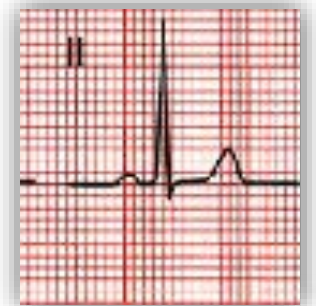
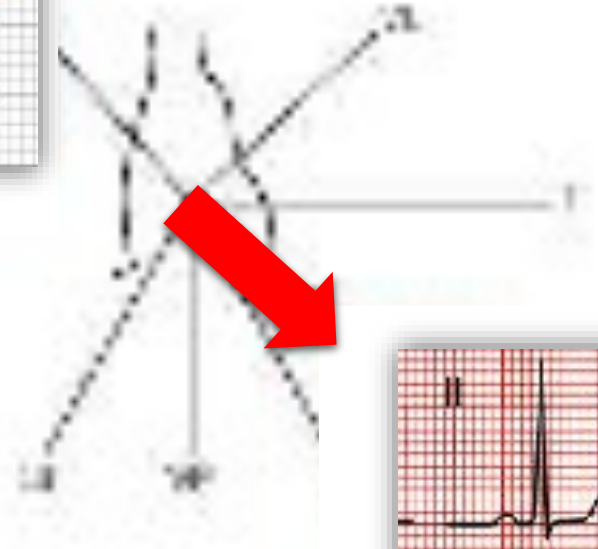
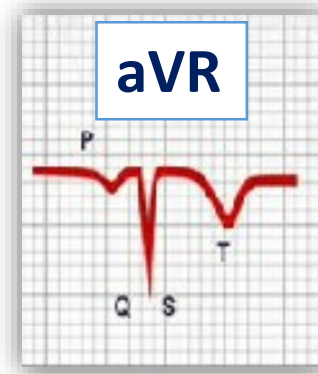


x1.0 0.05-150Hz 25mm/sec

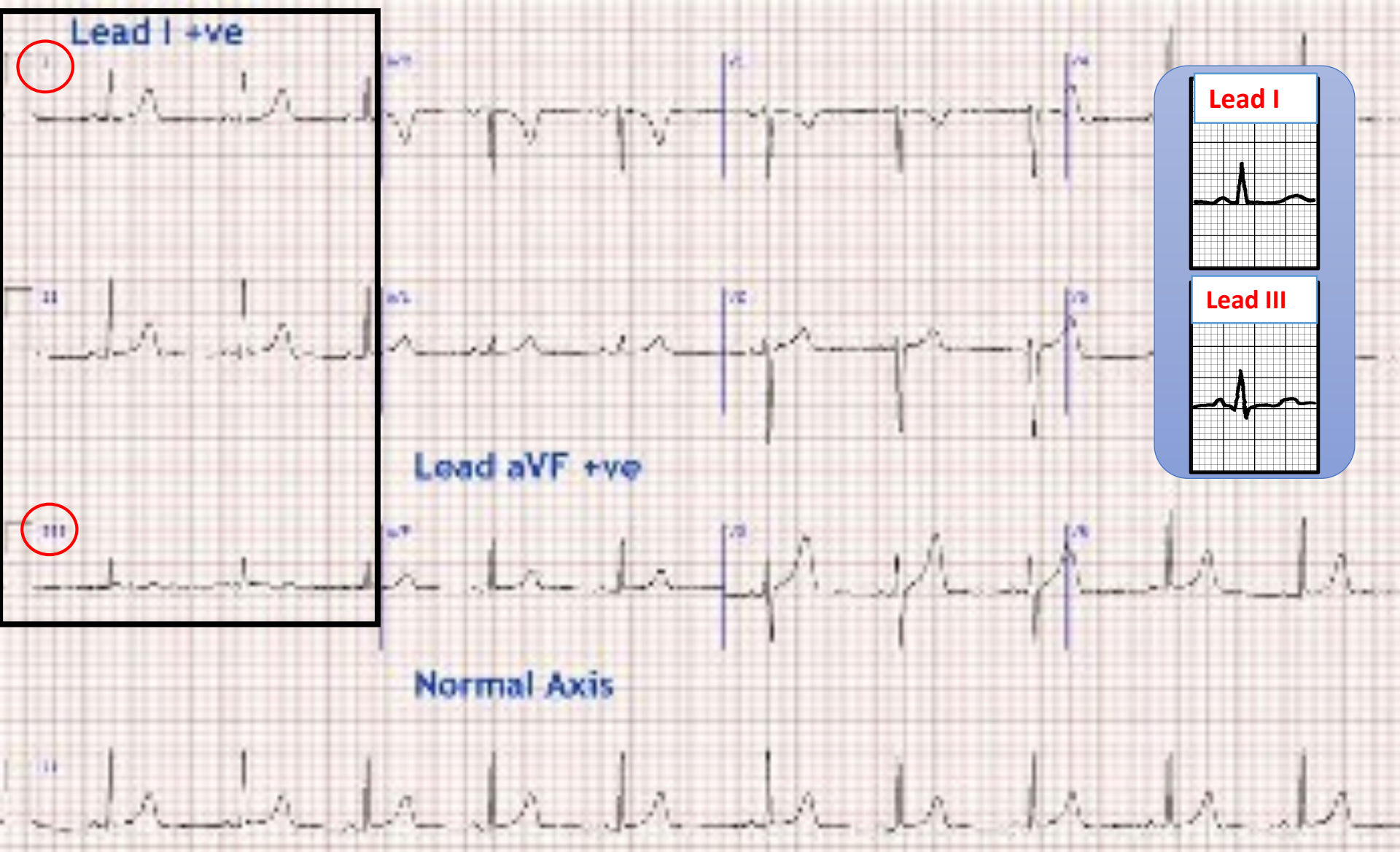


NML

Clinical Importance



Lead II



n

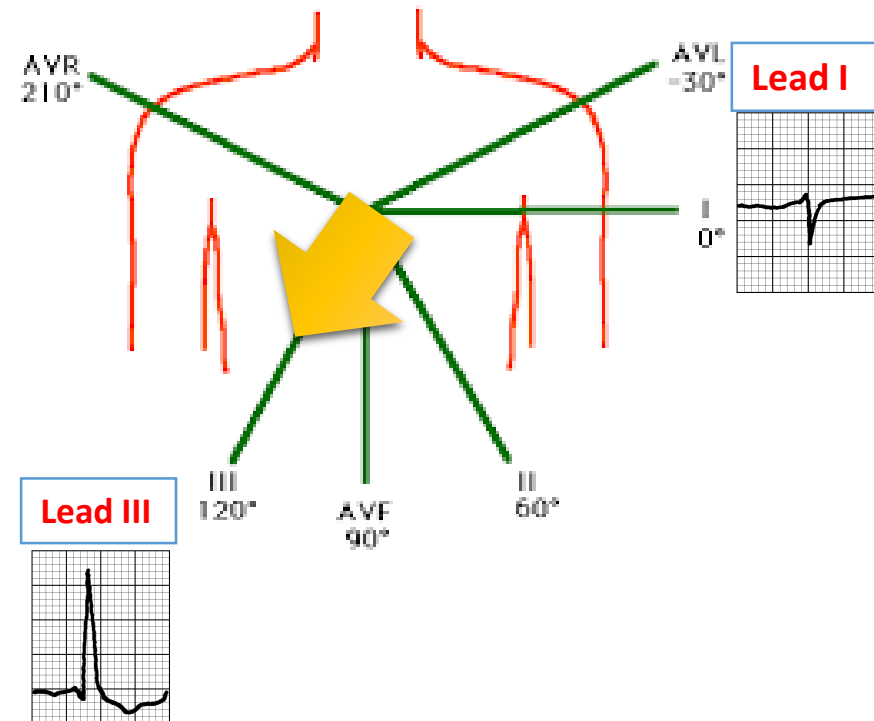


**AMI may lead
to deviation of
the cardiac
axis**

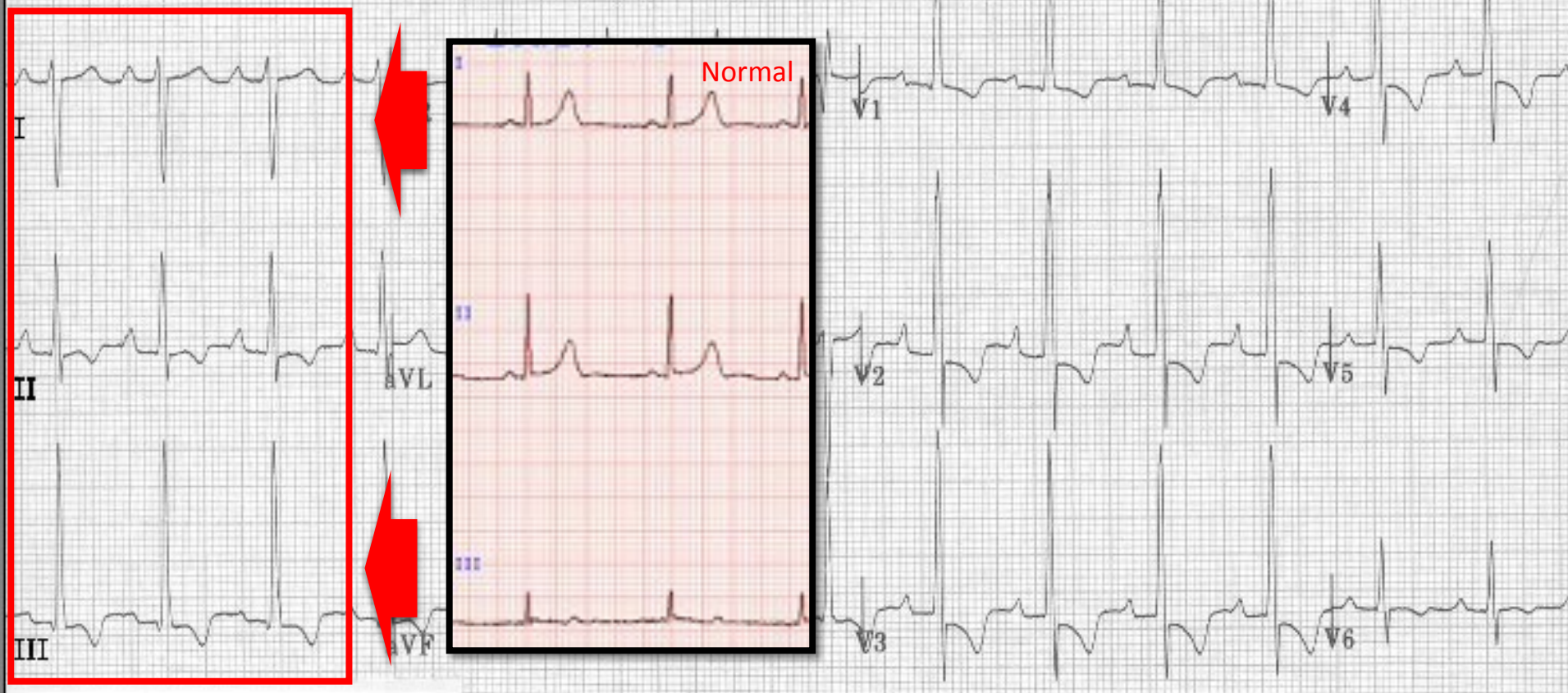


AMI WITH LAD

RVH

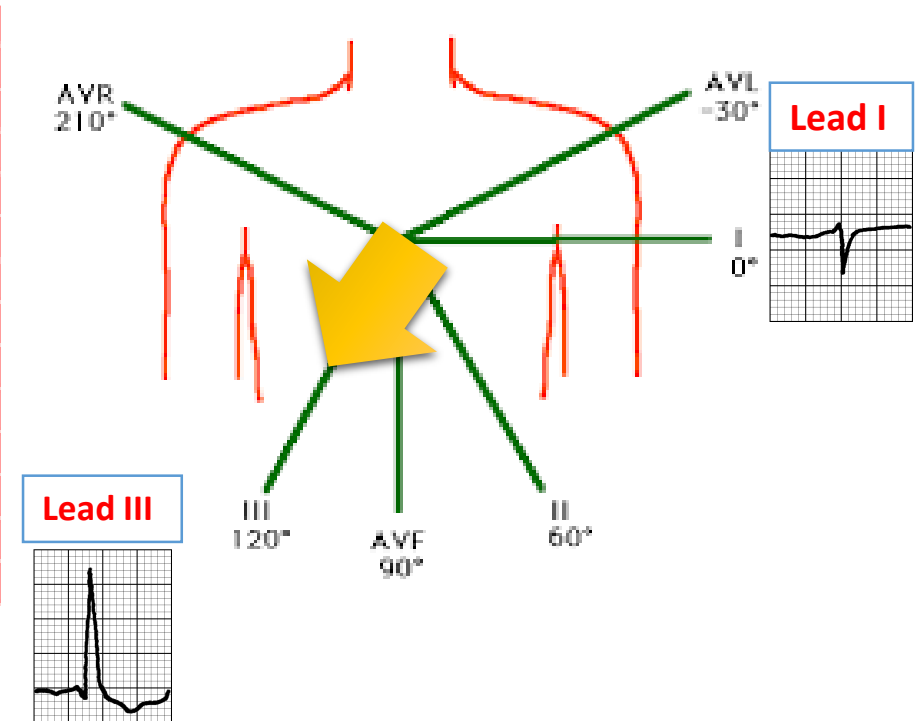
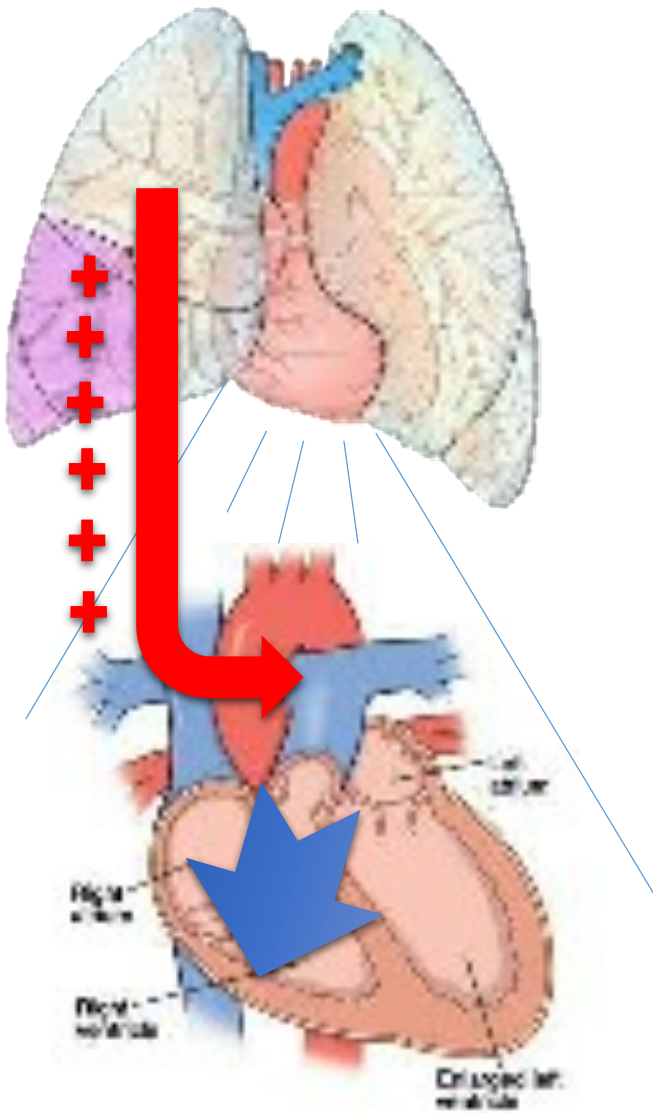


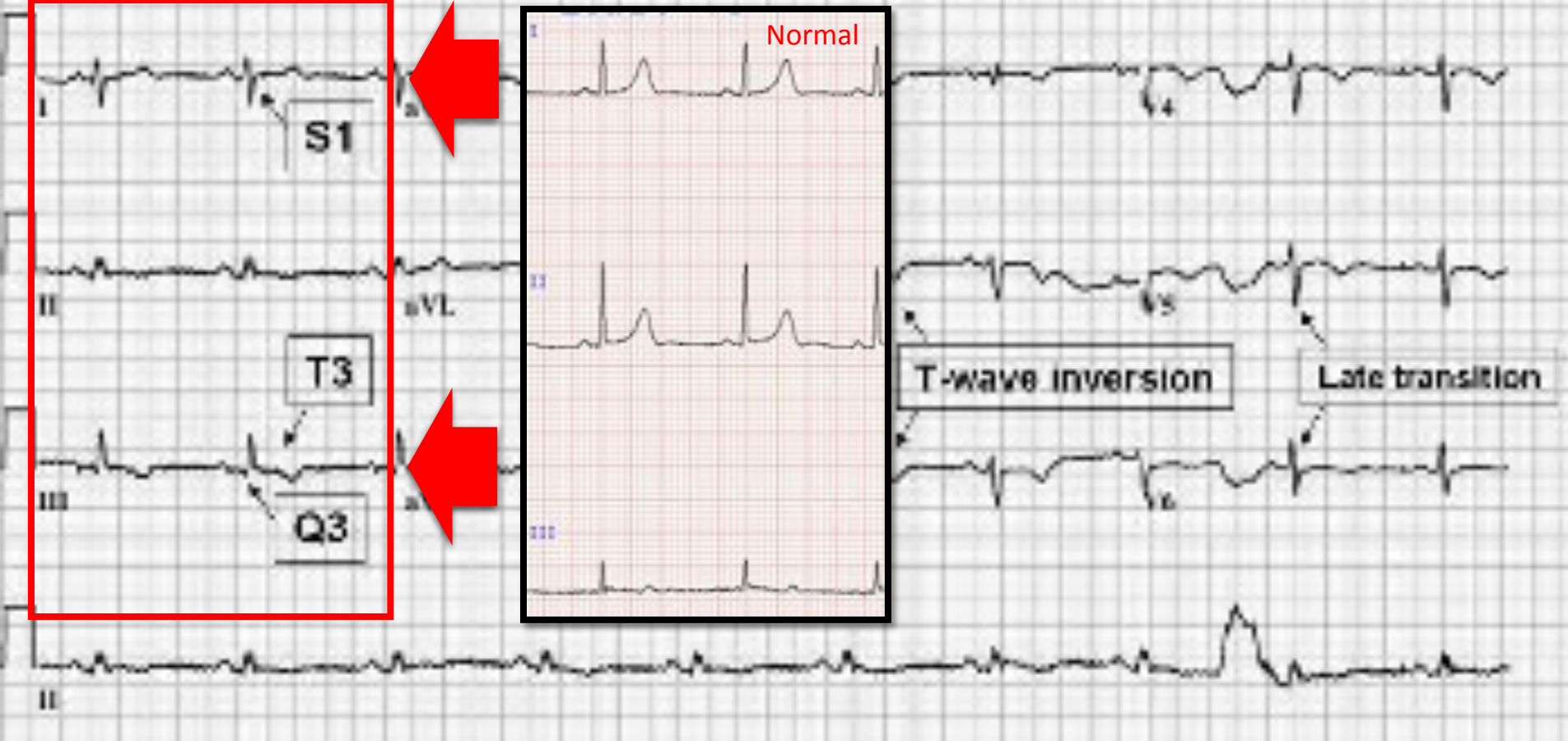
Female Caucasian
Age 18



RVH WITH RAD

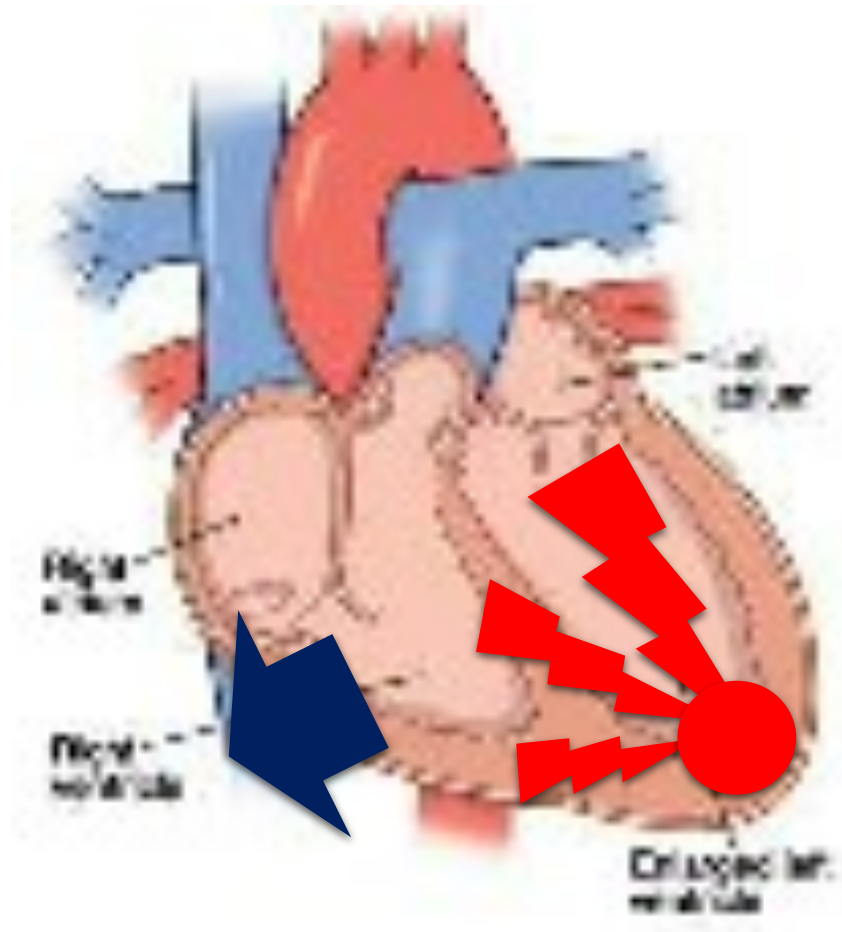
Pulmonary Embolism





RAD in pulmonary embolism

Ventricular Tachycardia VT



The presence of abnormal cardiac axis supports the diagnosis of VT



RAD IN VT



Normal axis in SVT

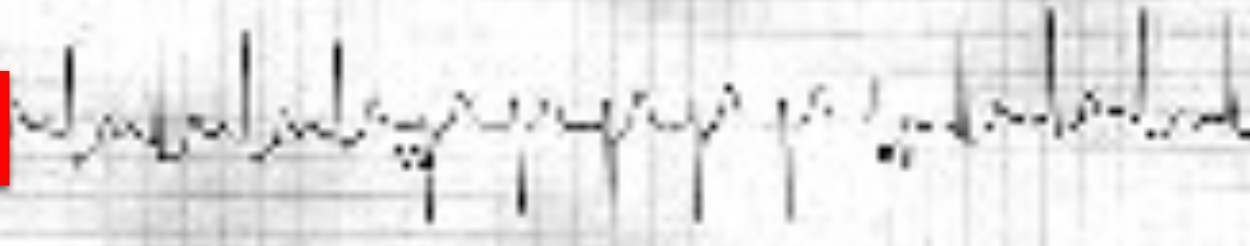
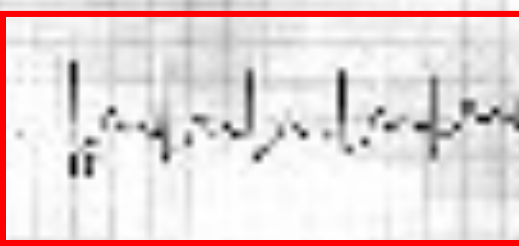
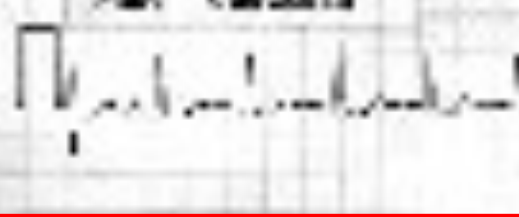
Test Yourself



Comment on the Cardiac Axis



CLAPNET 1:01
Pulse: 60/min



CLAPNET 1:01

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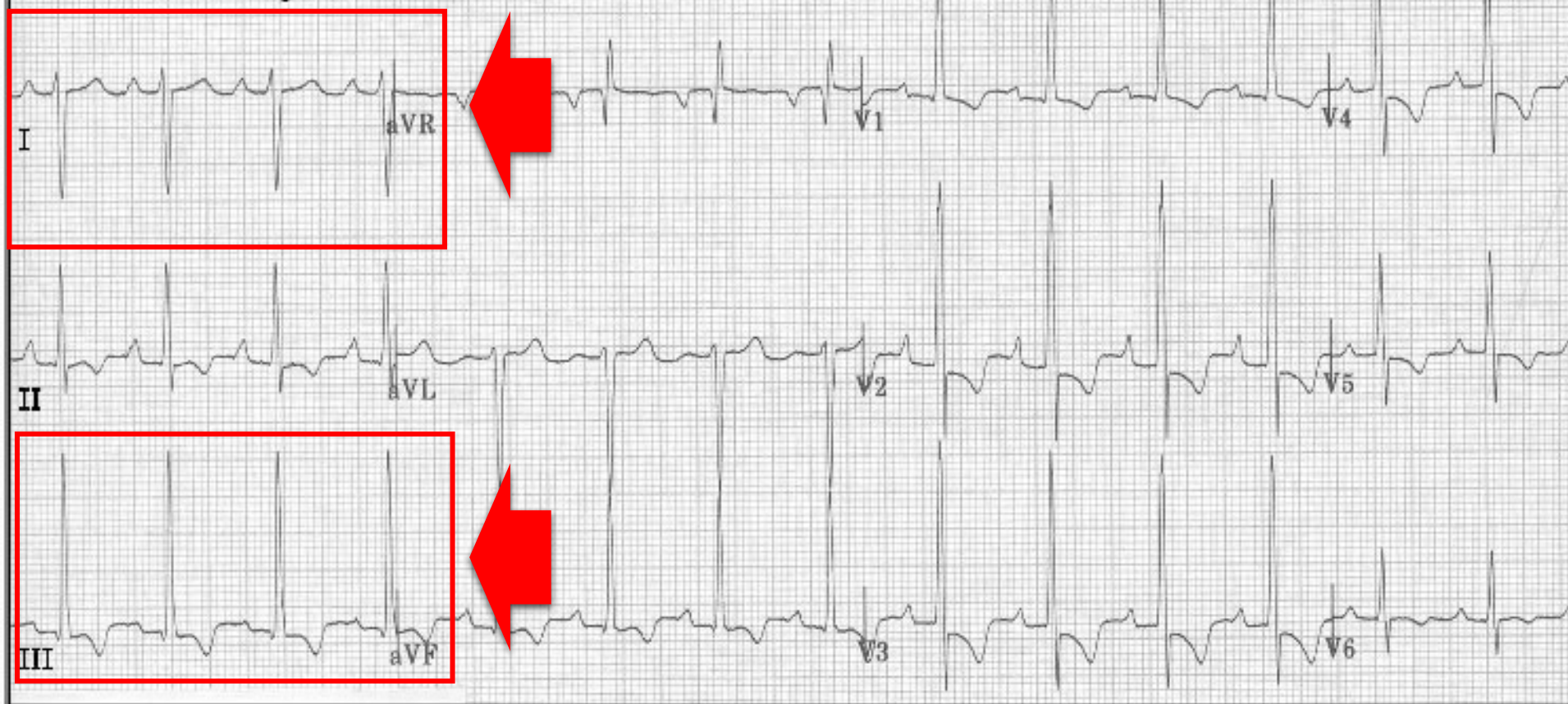




Normal

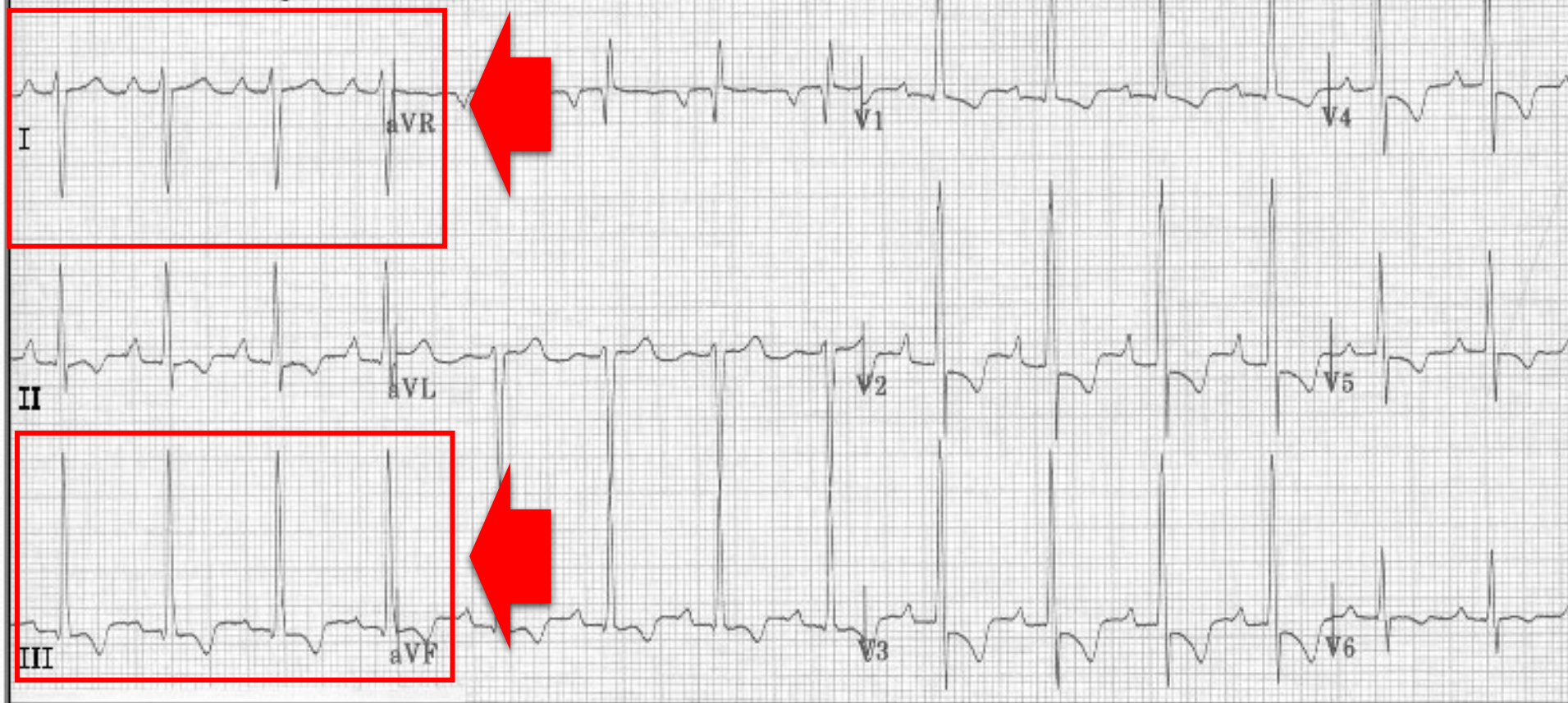
Female Caucasian

Age 18

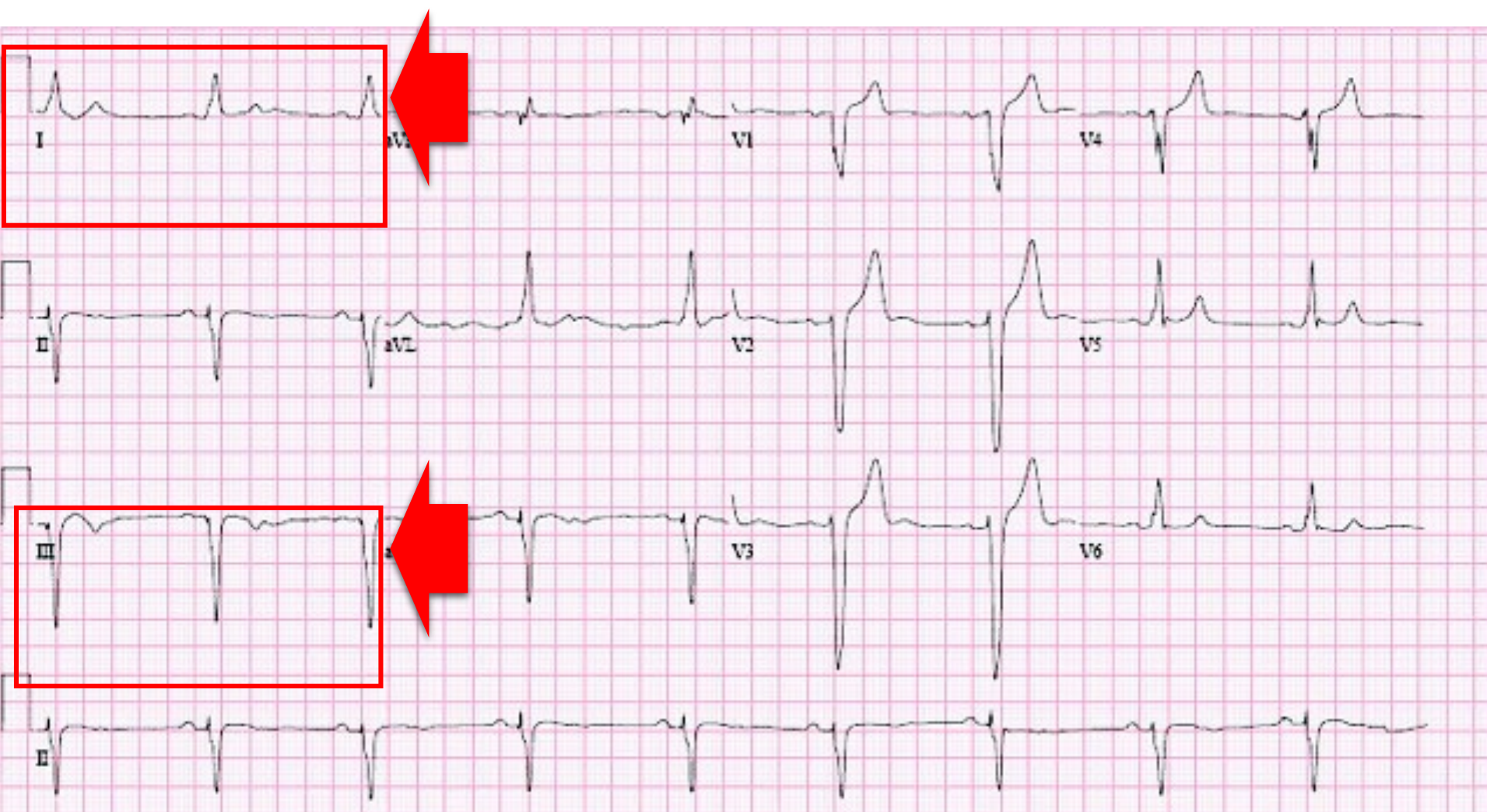


Female Caucasian

Age 18



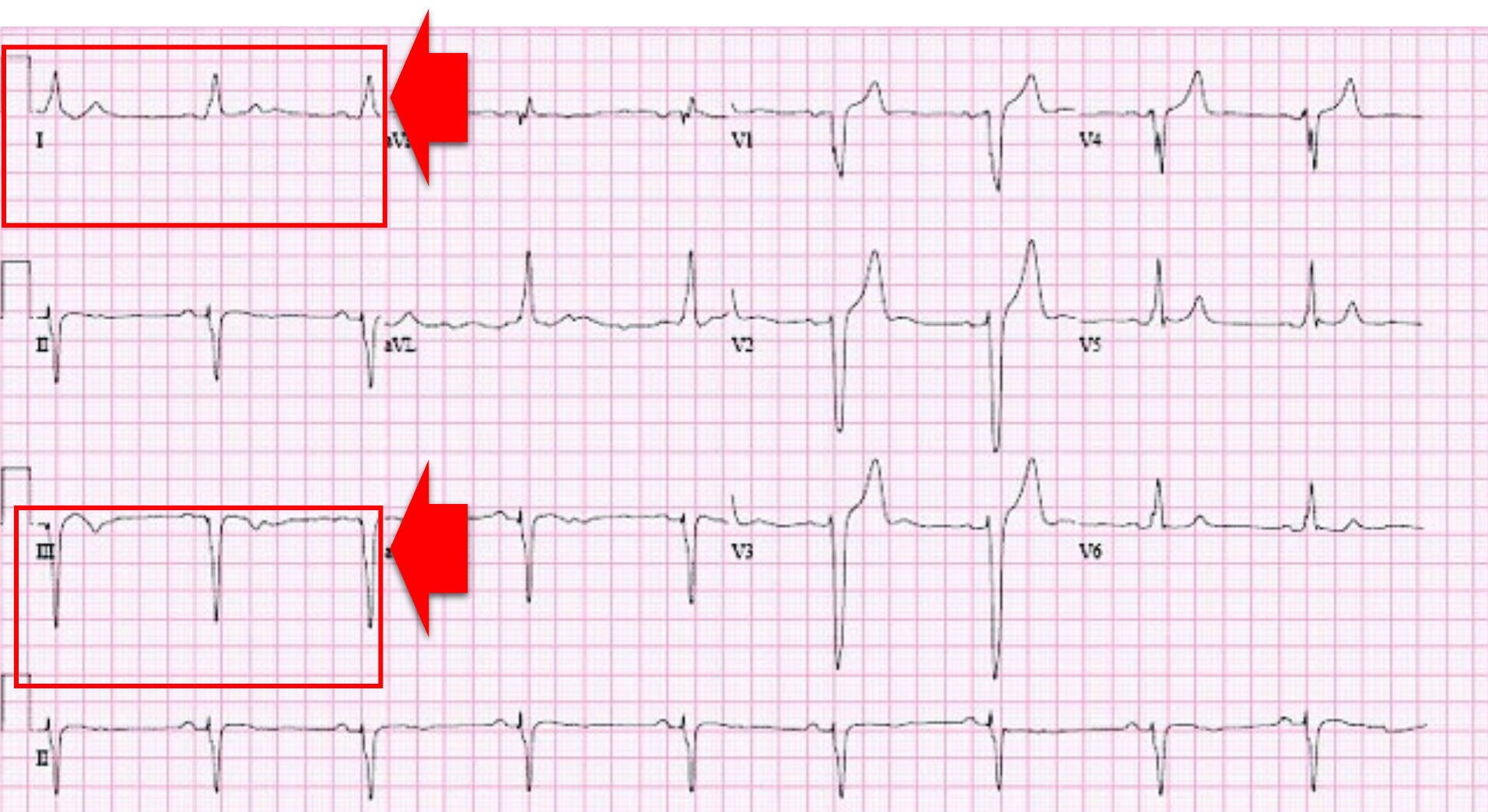
RAD



25mm/s 10mm/mV 100Hz 005C 12SL 231 IDC-45

EID-214 EDT: 10:28 16-jun-2006 ORDRE:

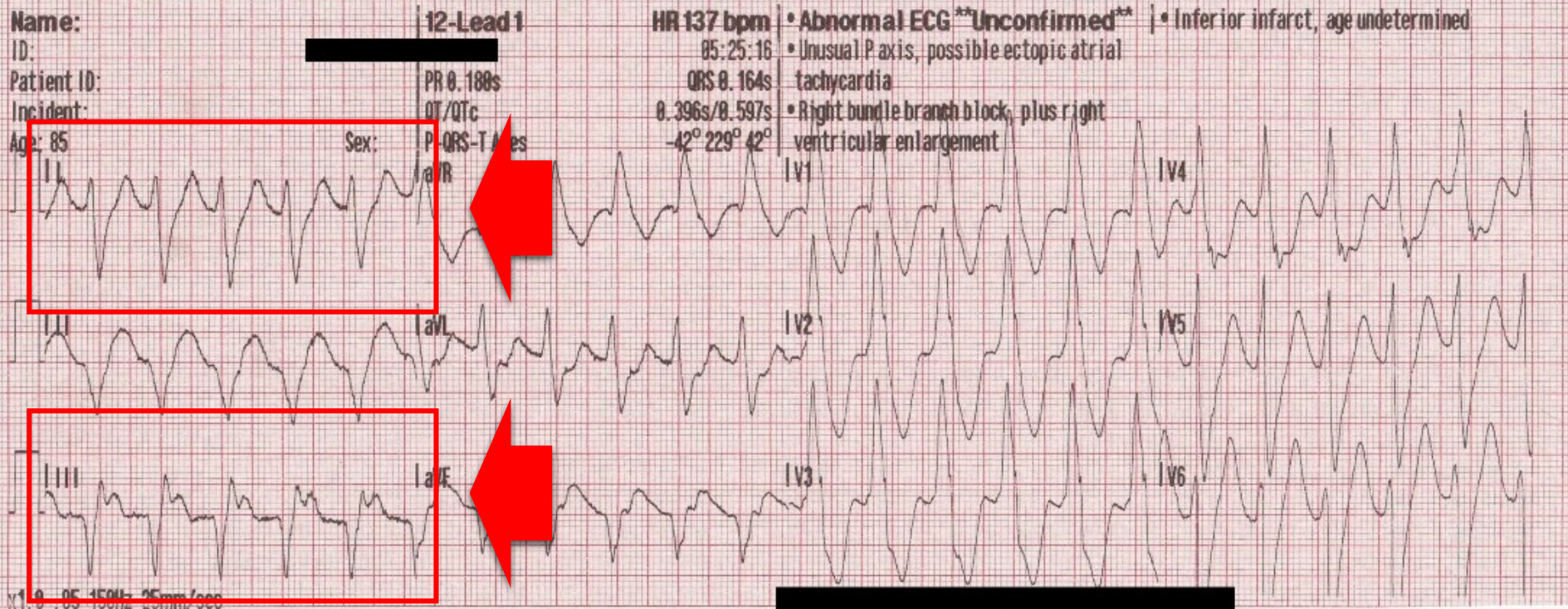


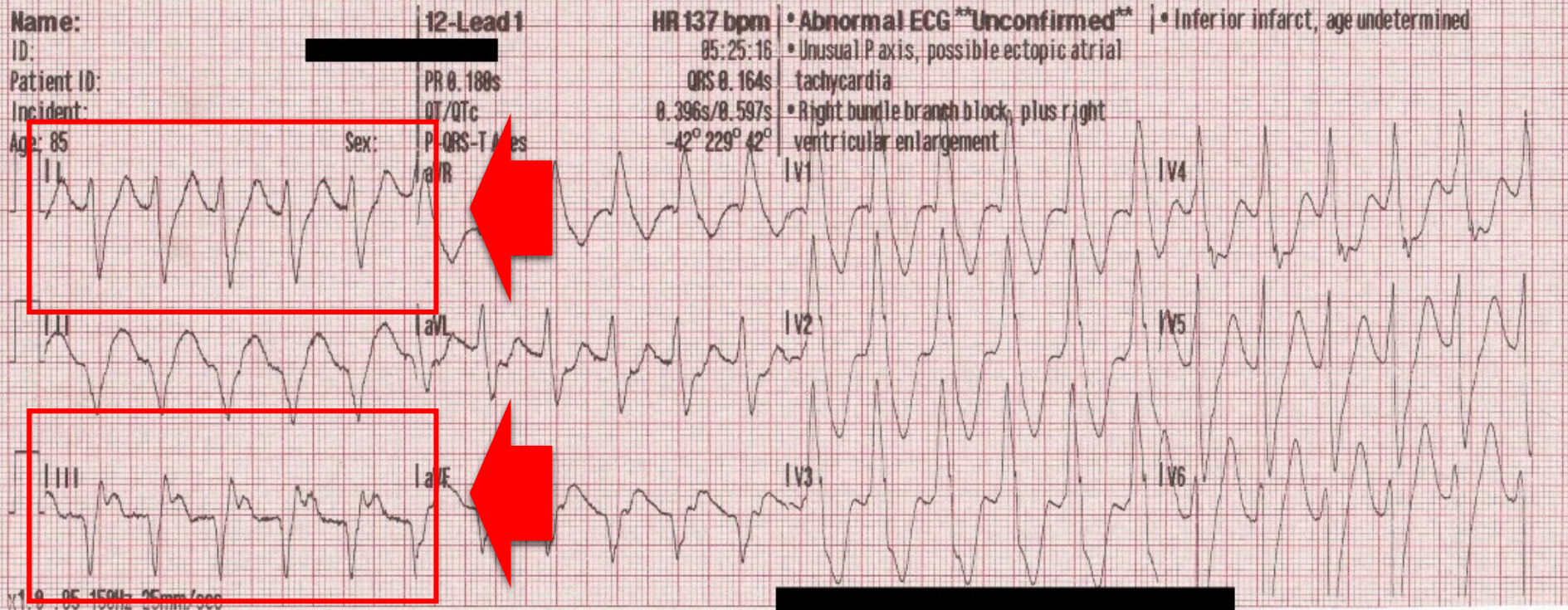


25mm/s 10mm/mV 100Hz 005C 12SL 231 IDC-45

EID-214 EDT: 10:28 16-jun-2006 ORDRE:

LAD





NML

The P wave

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

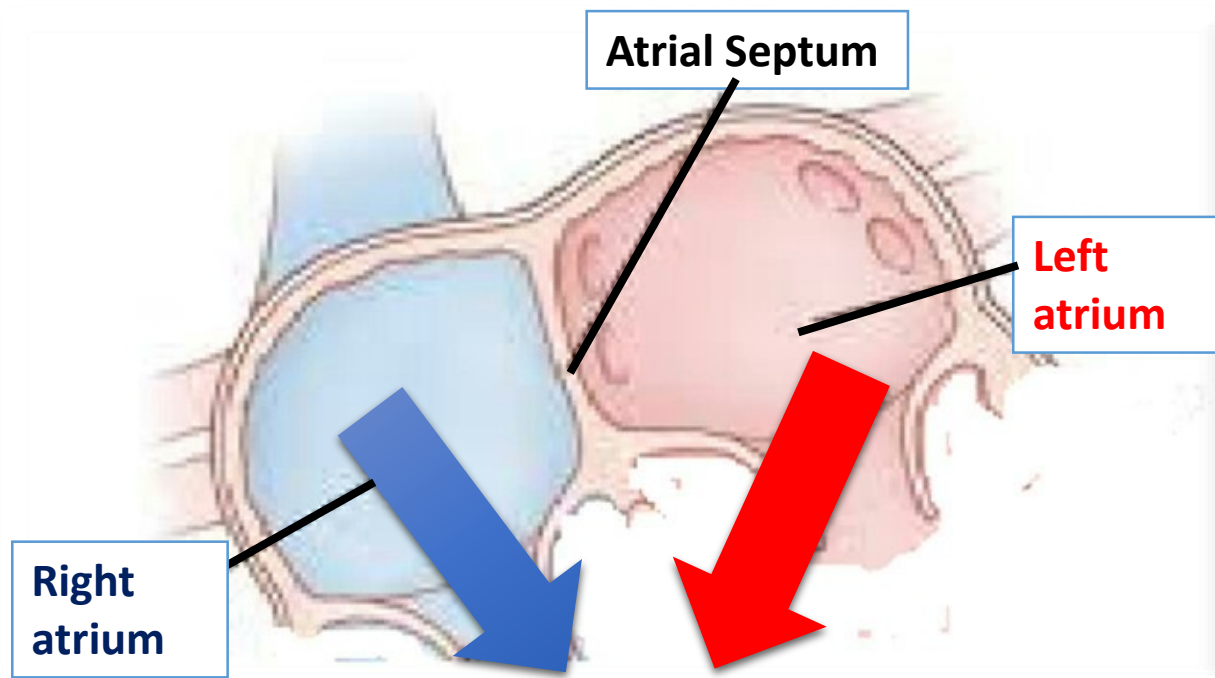
**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

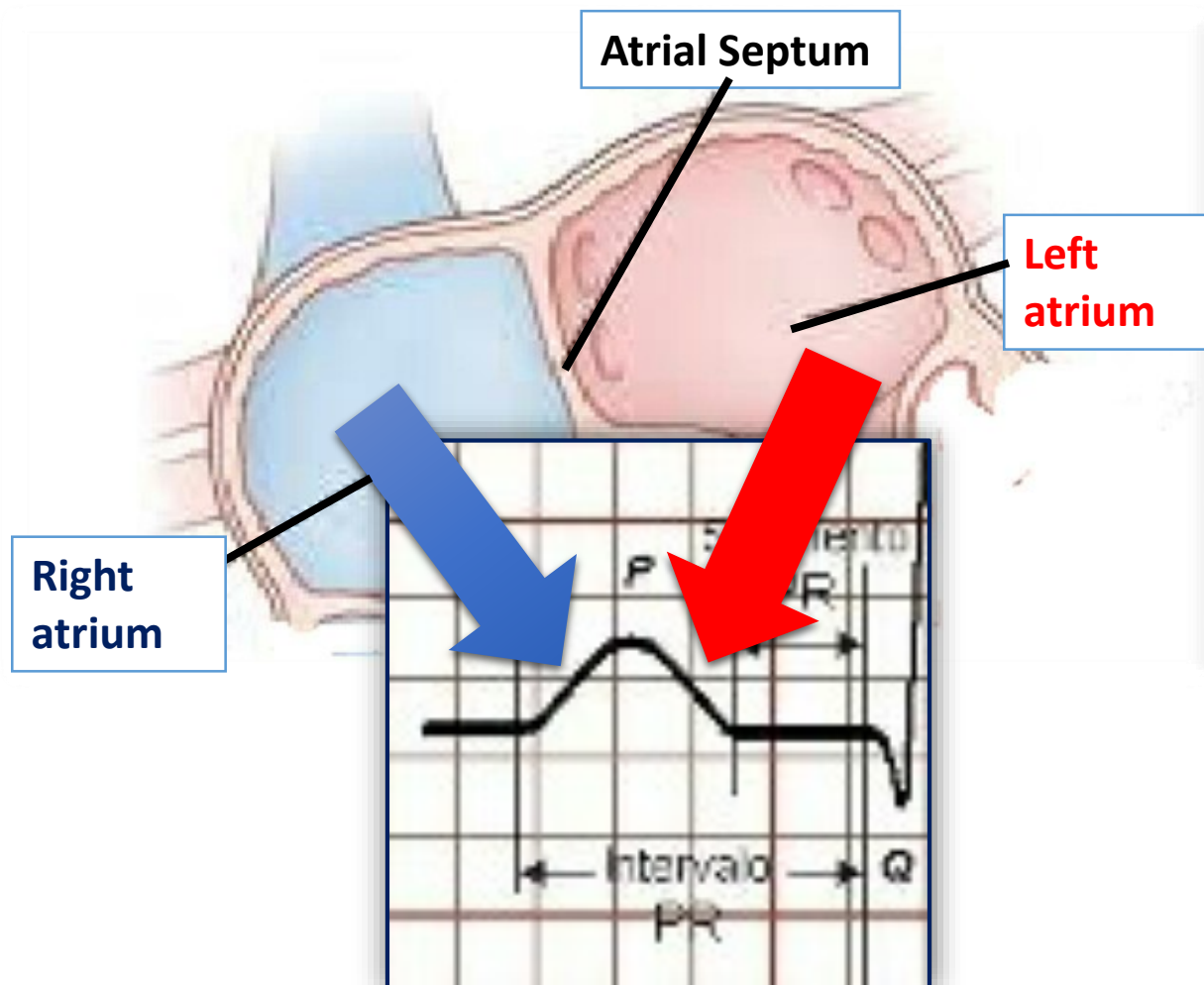
هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في هذا الموقع هم
تحت حماية قانون الملكية الفكرية و لا يحق لأحد إستخدامه أو إستنساخه أو
تحميله على أى كمبيوتر أو إعادة طبعه أو طبع أجزاء منه بدون إذن مسبق من
الدكتور طارق عبد الحميد (أو من ينوب عنه قانونياً) . و من يتعدى على
الملكية الفكرية المذكورة فسوف يتعرض للمسائلة القضائية عن جريمة إنتهاك
حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول
فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص برجاء
الإتصال بالدكتور طارق عبد الحميد

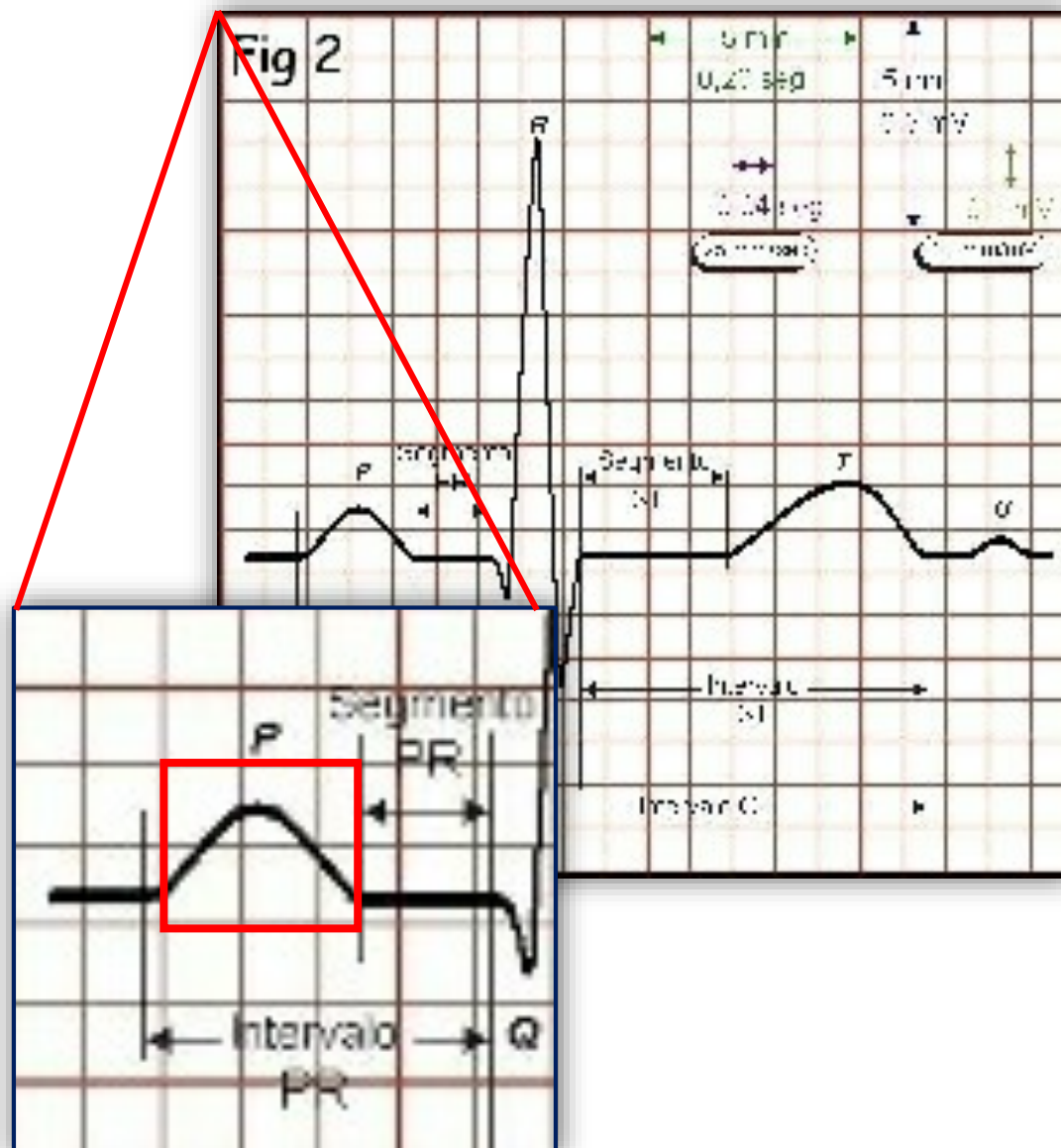


P wave

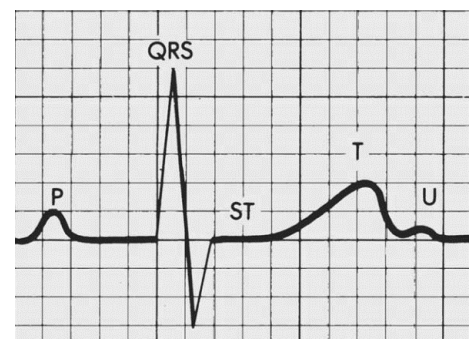
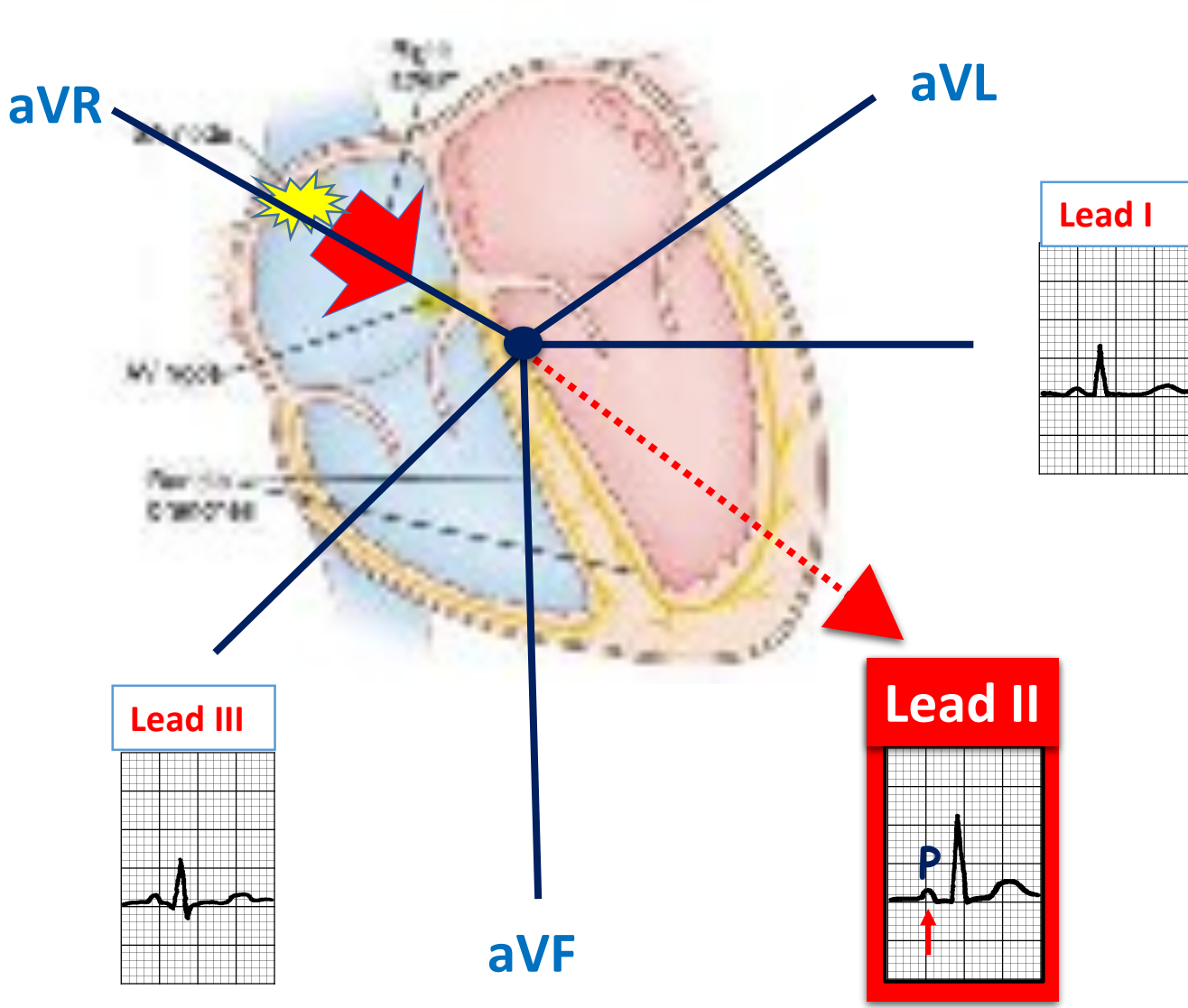


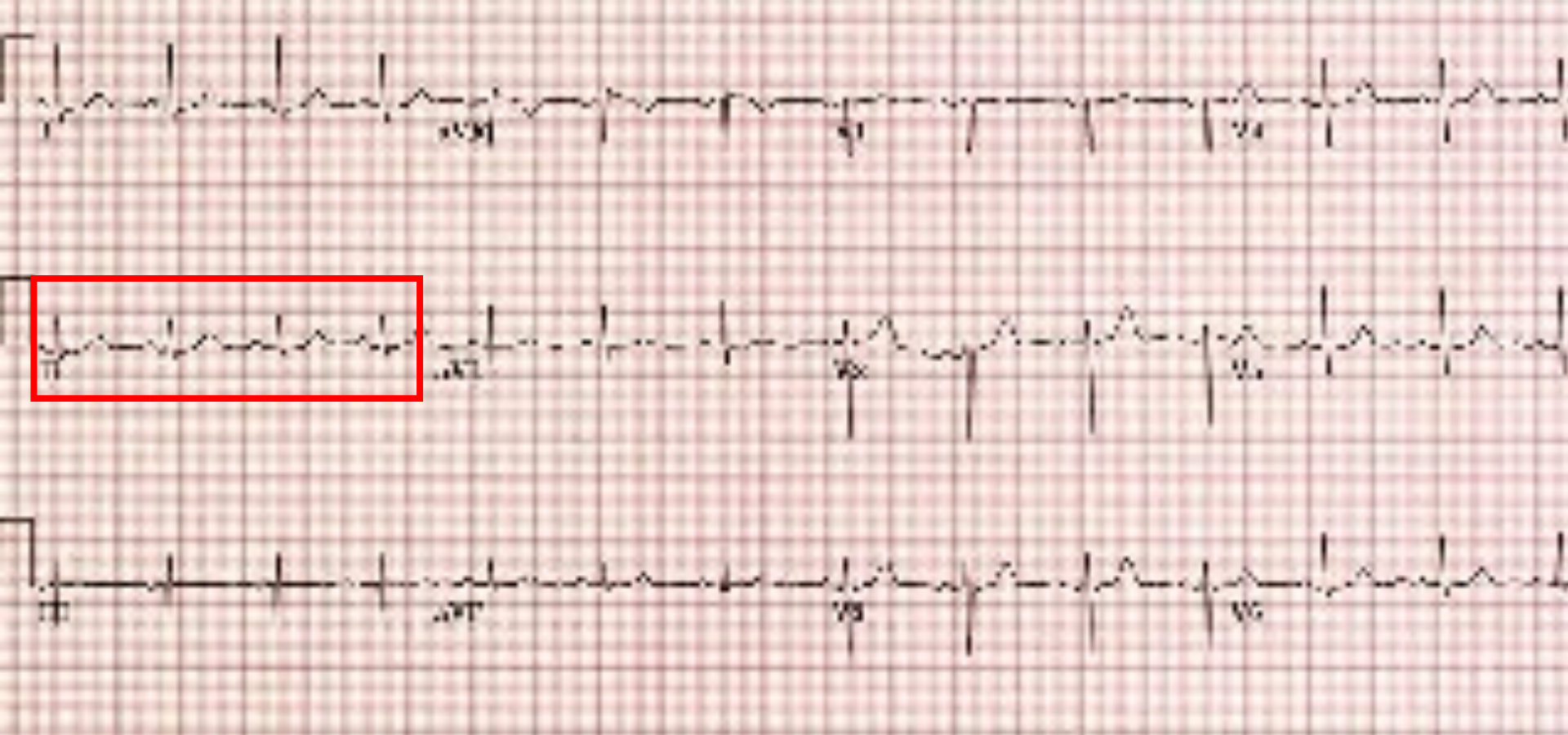


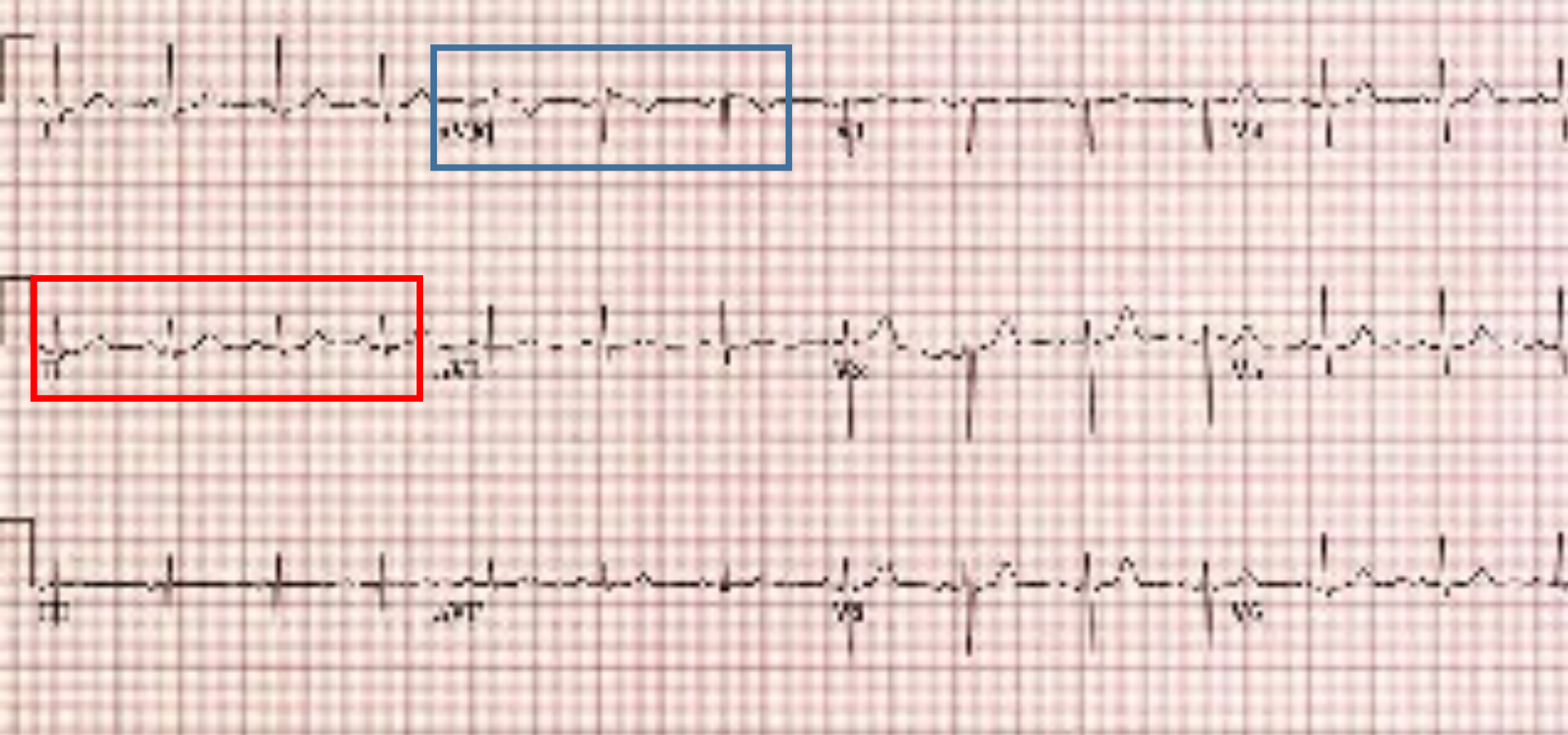




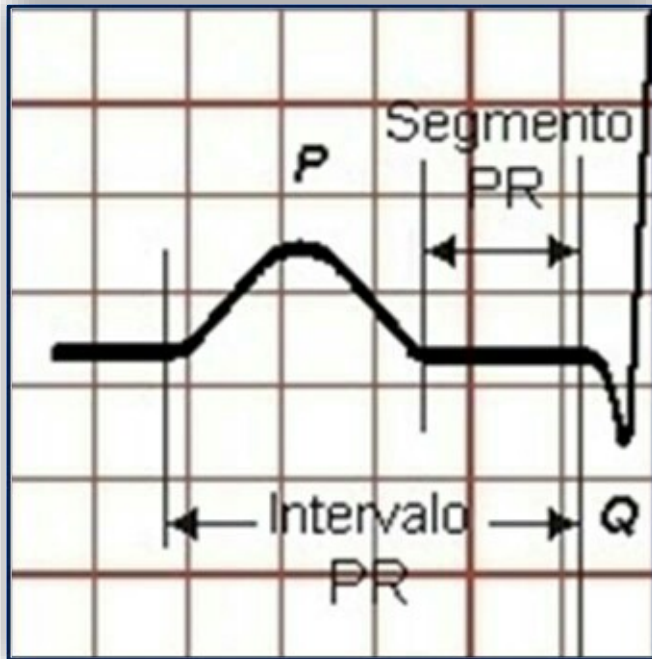
**Normal P wave is
not more than 2.5 X
2.5 small squares**







Comment on the following points



- 1 Existence
- 2 Duration
- 3 Amplitude
- 4 Number
- 5 Dropped beats
- 7 Direction
- 6 Shape in the same lead
- 8 P- terminal Force in V1

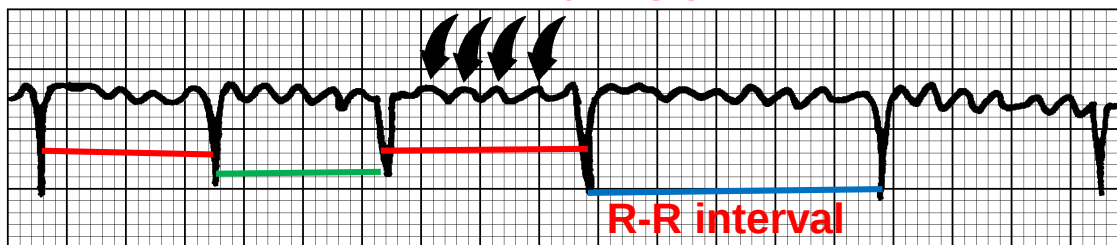
① Existence

400-600 beat per minute



IRREGULAR

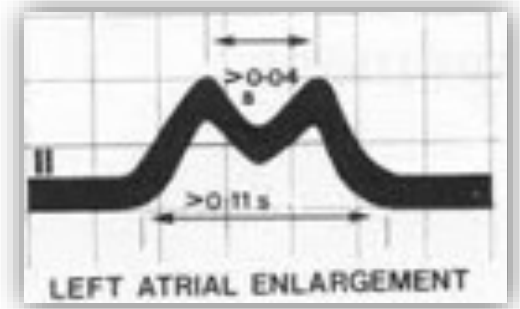
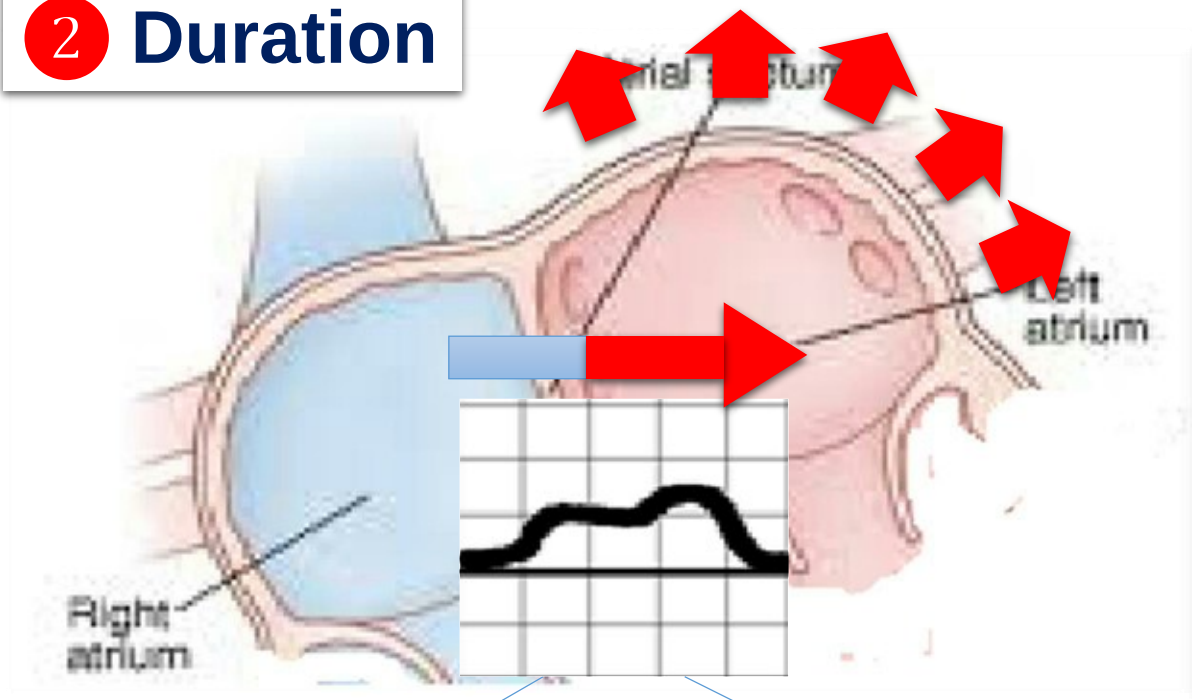
"f" waves



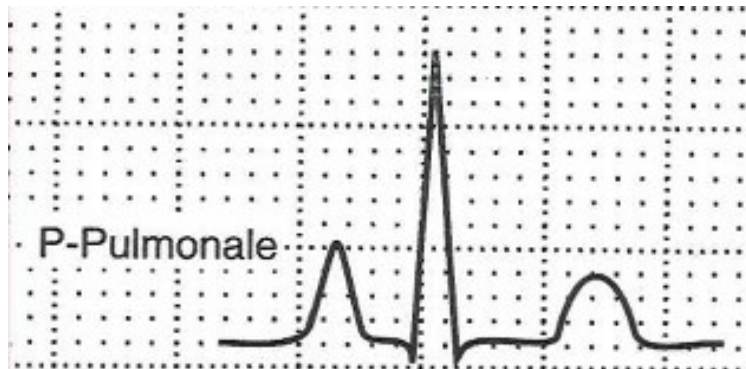
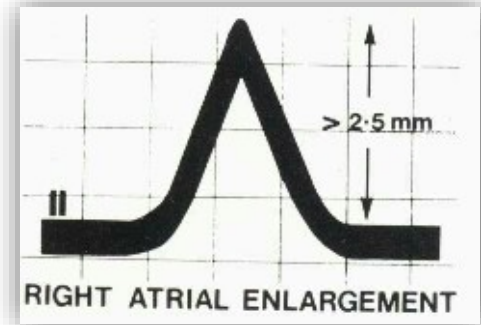
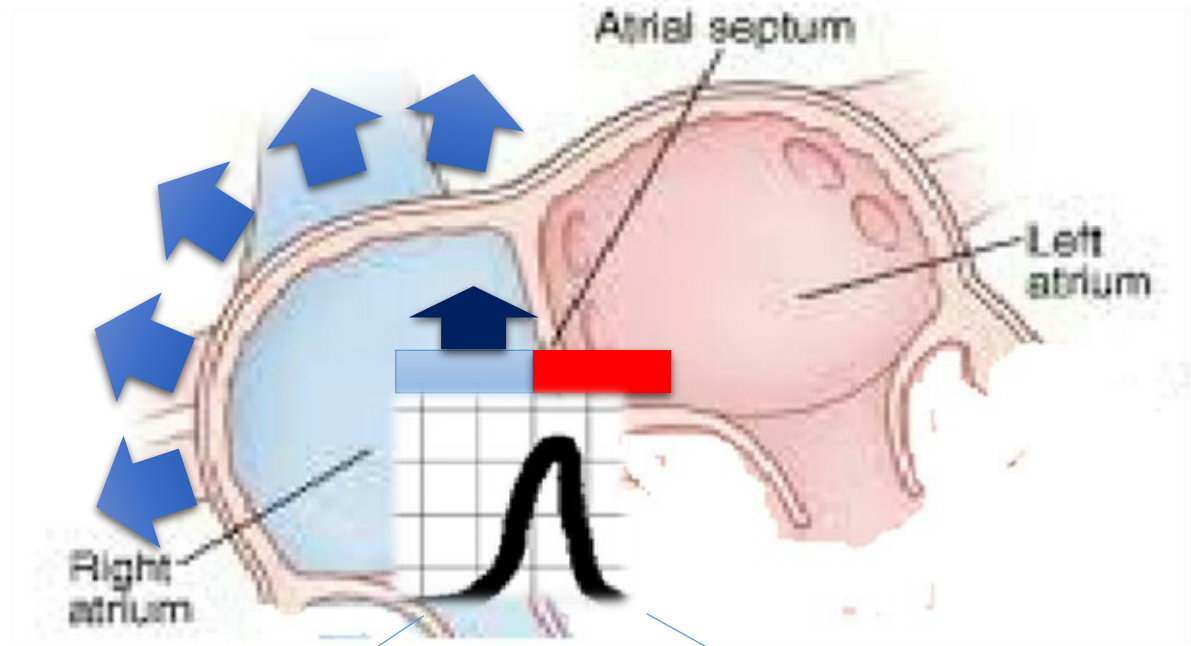
Atrial fibrillation

- ① Totally irregular cardiac rhythm
- ② Absent P waves
- ③ The base line of the heart shows fibrillatory "f" waves (instead of the P waves)

2 Duration



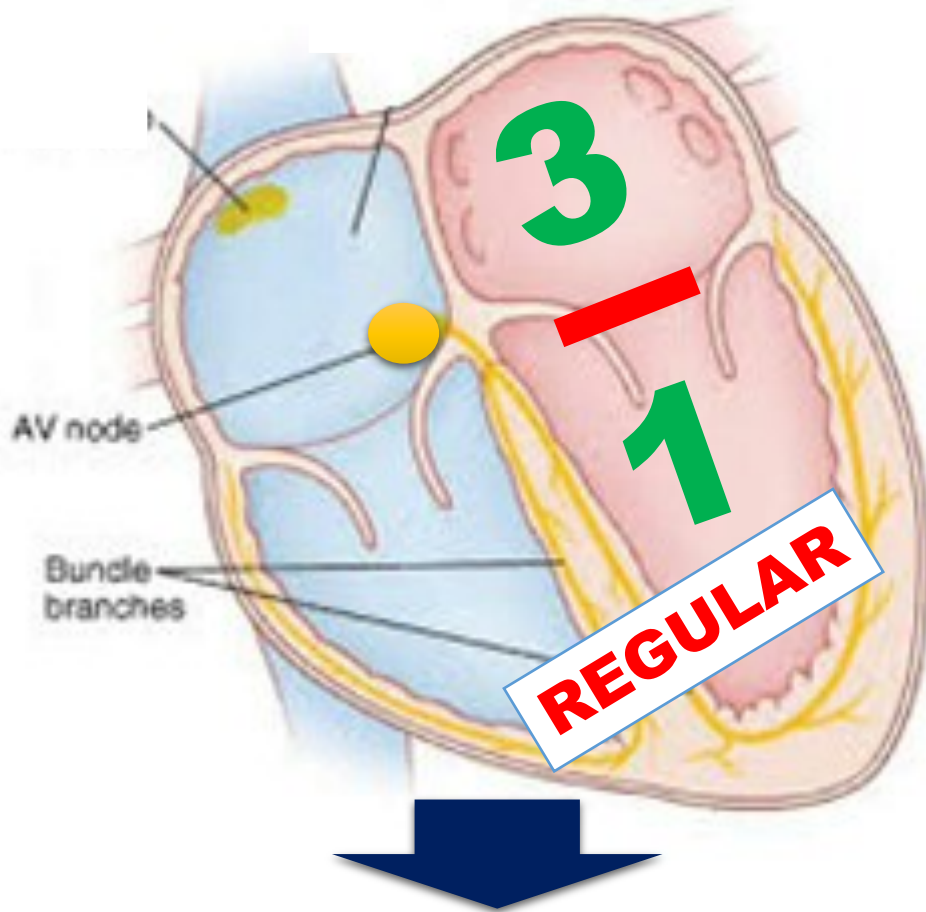
3 Amplitude



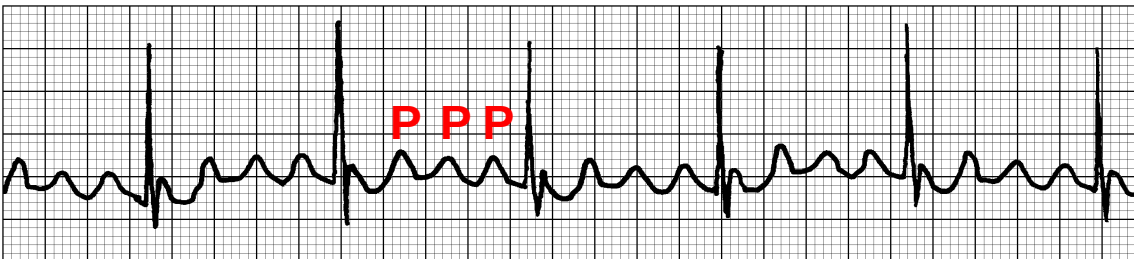
4 Number

Atrial flutter

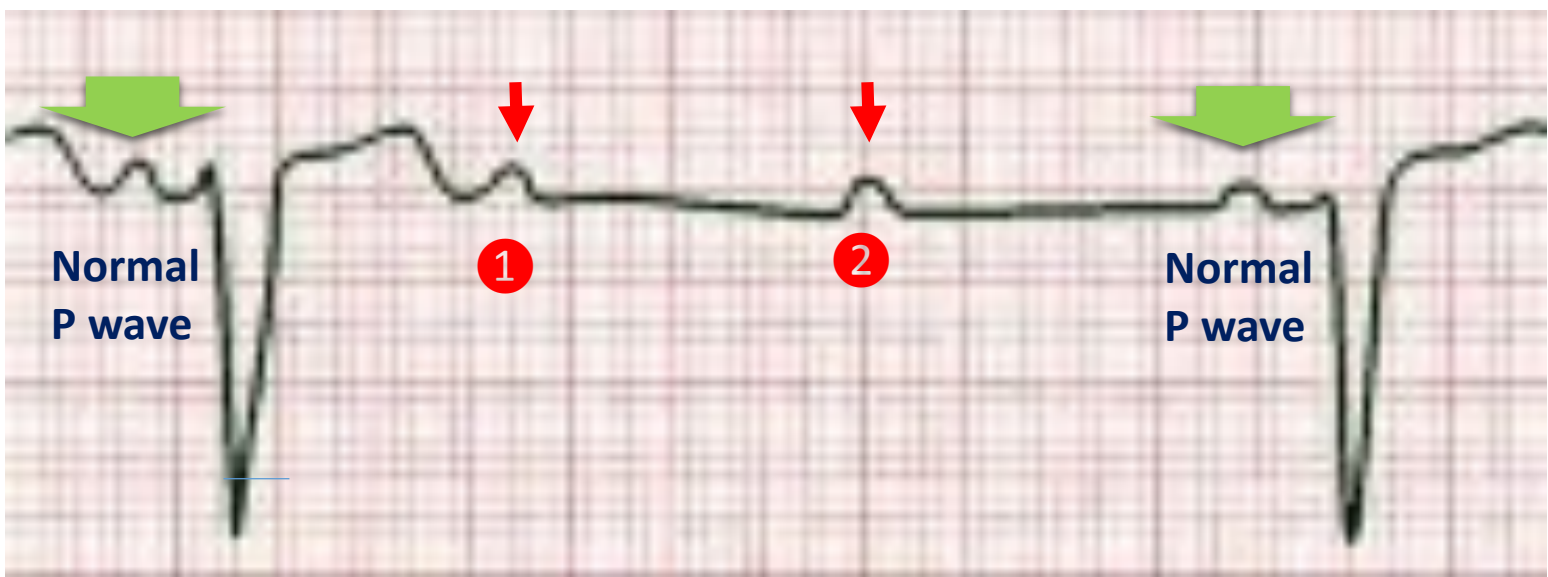
- 1 Multiple P-waves for each QRS complex (e.g. 2:1 or 3:1 Block).
- 2 Saw-teeth appearance of ECG
- 3 Regular



F waves

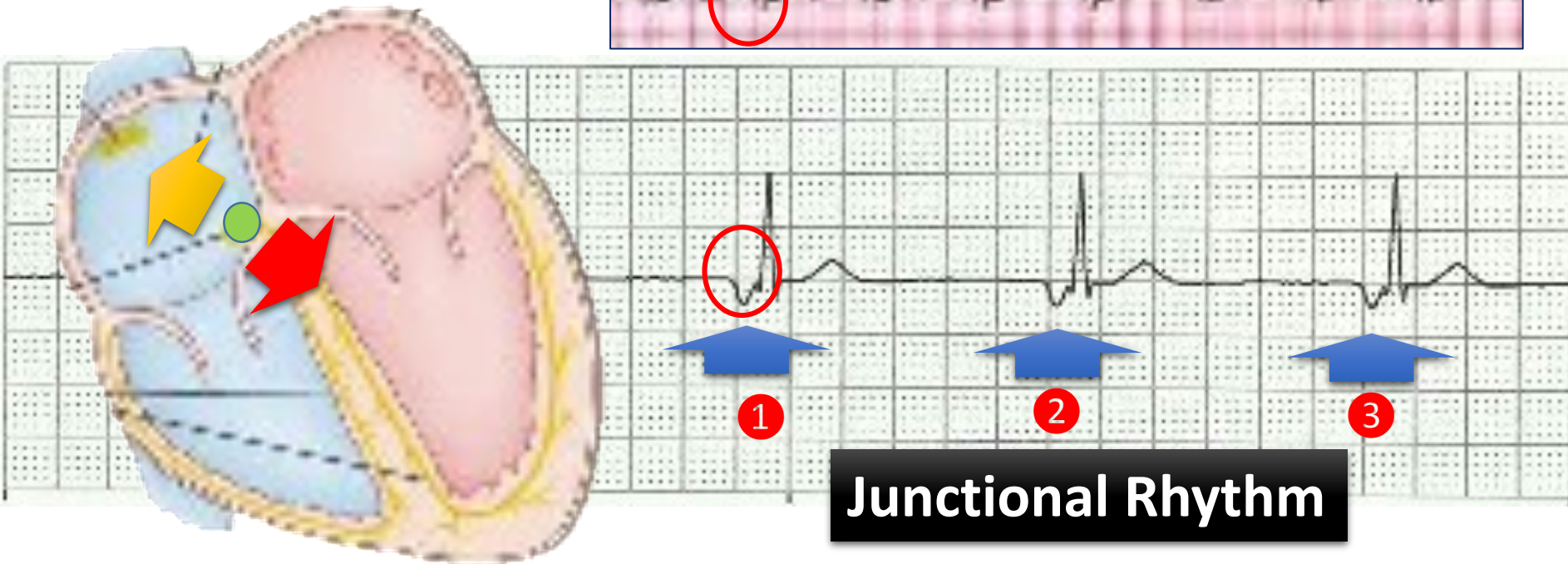
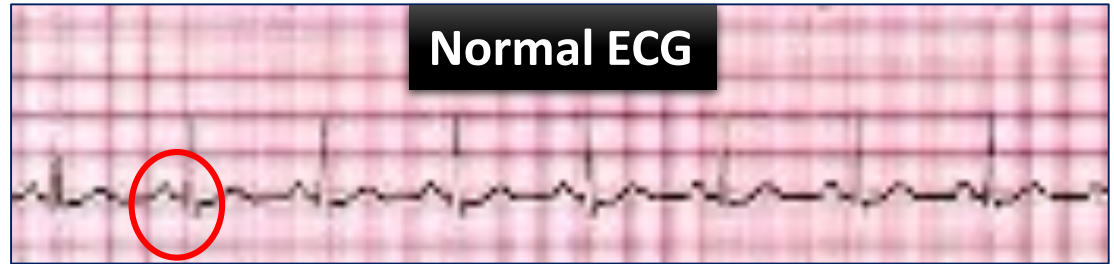


Occasional dropped beats



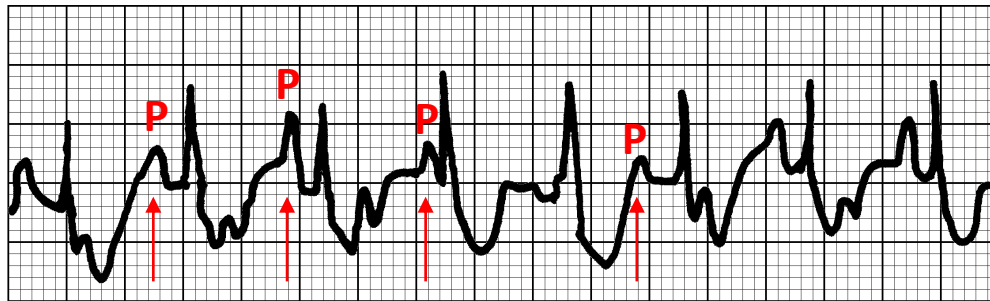
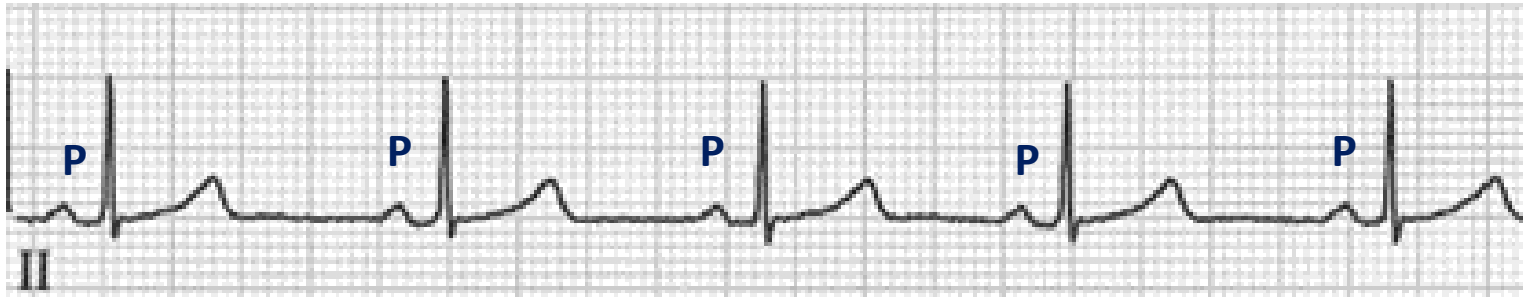
6 Direction

Inverted P waves

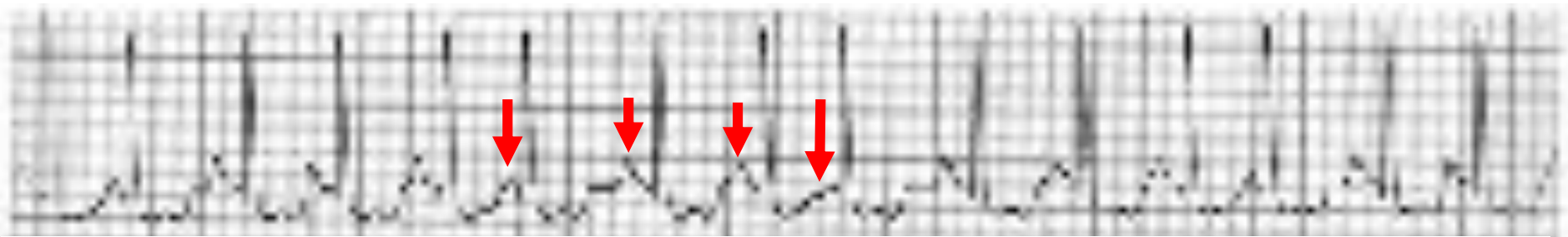
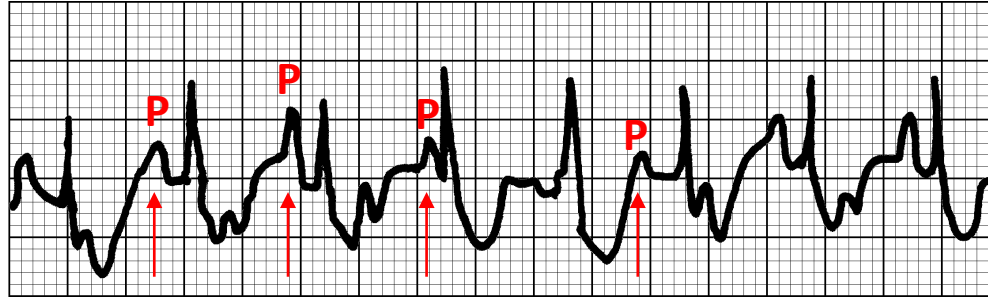


7 Shape in the same lead

Normal ECG



7 Shape in the same lead



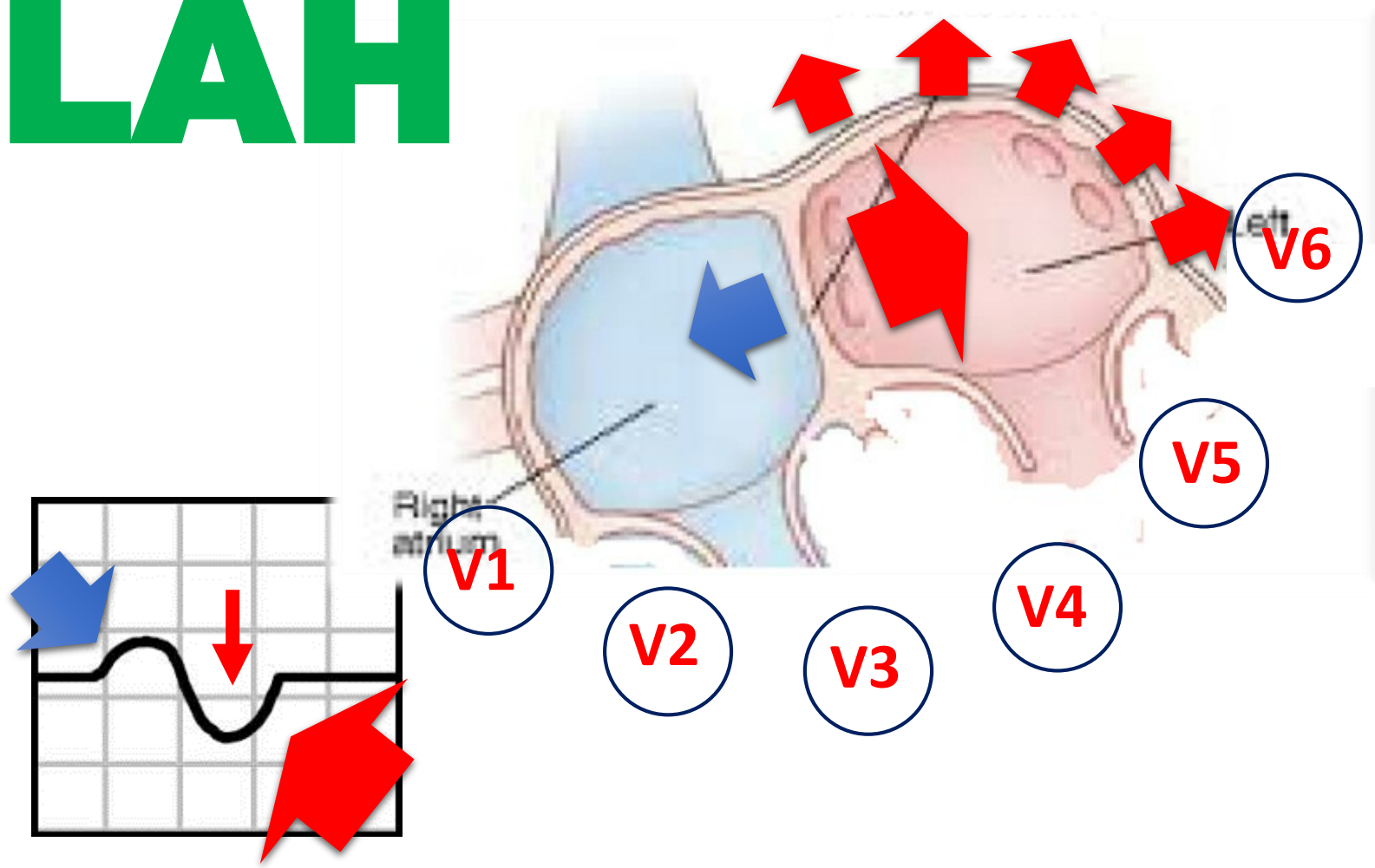
**Different P wave shapes in the same Lead in
Multifocal Atrial Tachycardia MAT**

Note

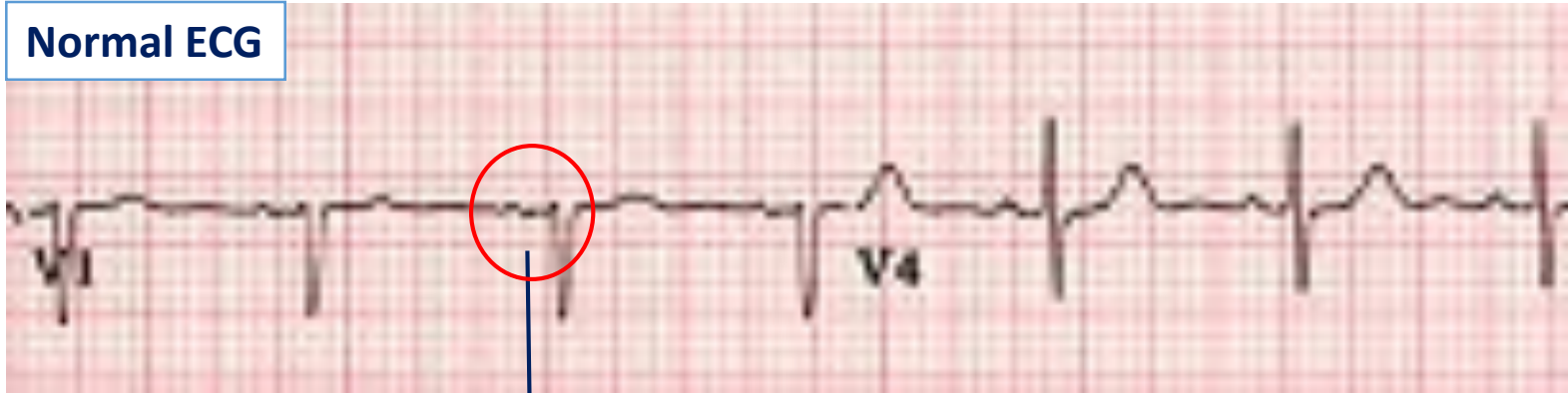


P-terminal force in V1

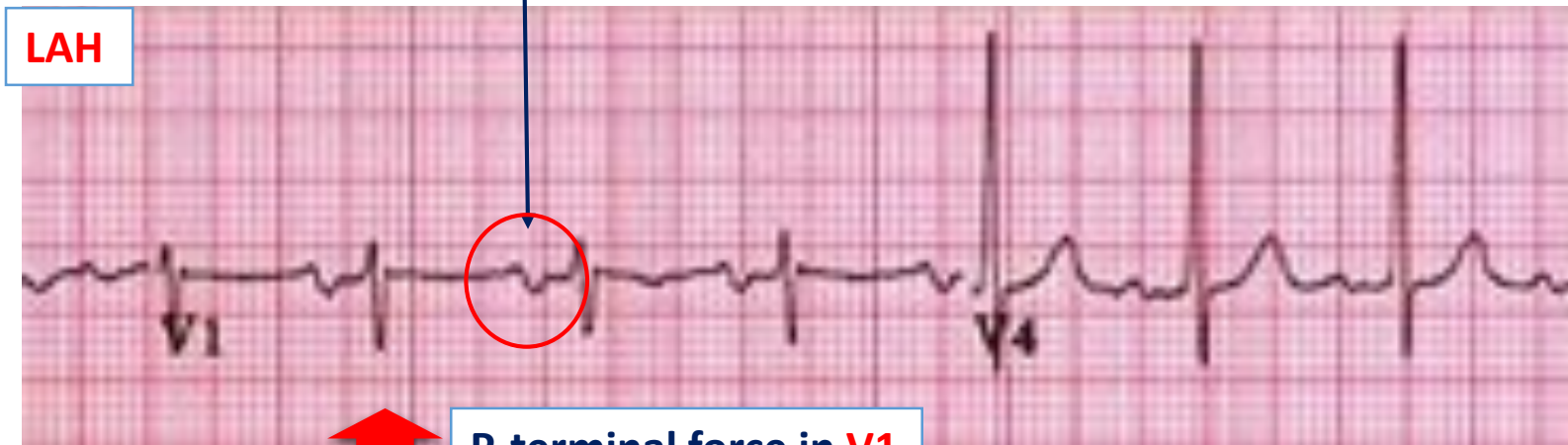
LAH



Normal ECG



LAH

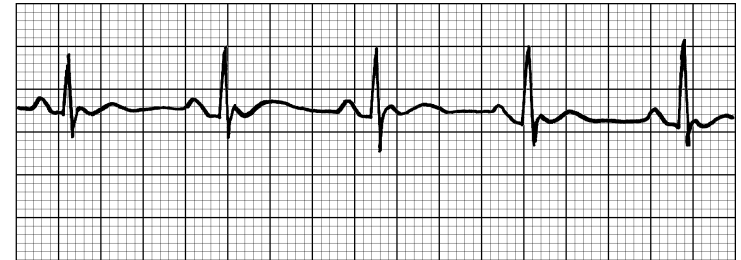


P-terminal force in V1

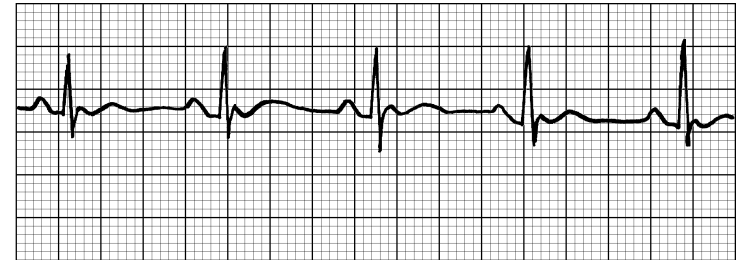
**Let us now
revise the P
wave
together**



P wave

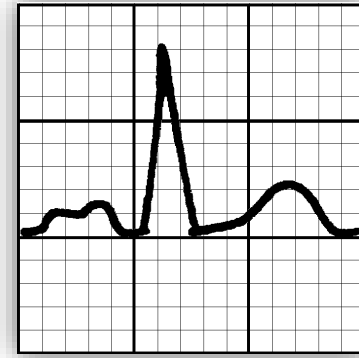


P wave

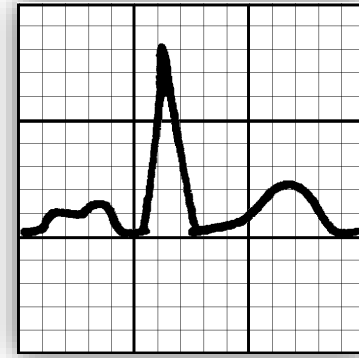


**Normal
Heart**

P wave

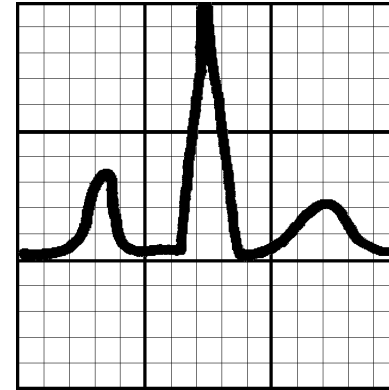


P wave

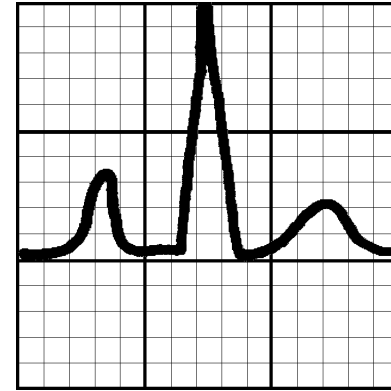


P-mitrale

P wave

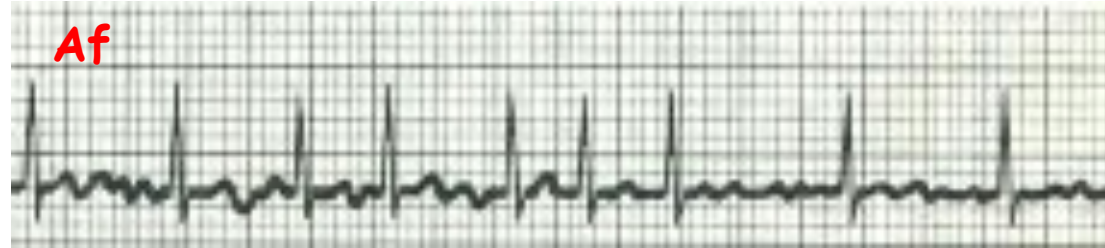


P wave

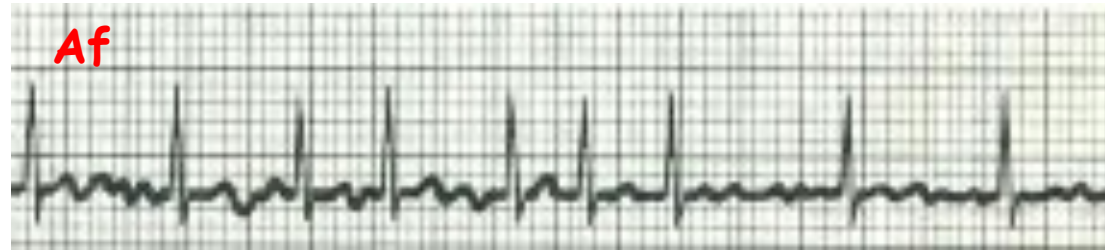


P-Pulmonale

P wave

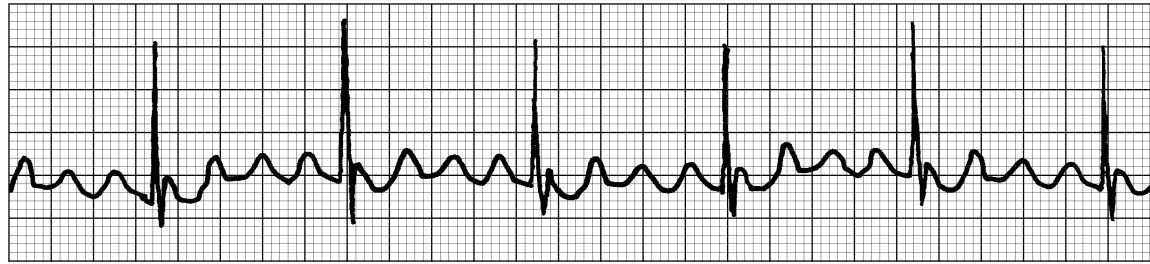


P wave

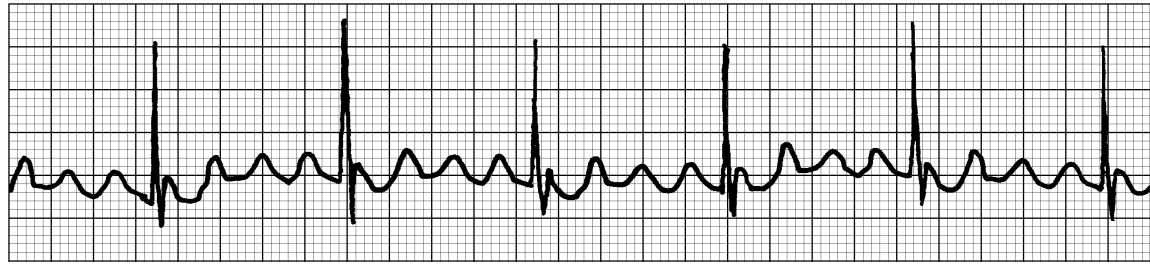


Atrial fibrillation

P wave



P wave



Atrial flutter

P wave



P wave



Occasional Dropped beats

P wave

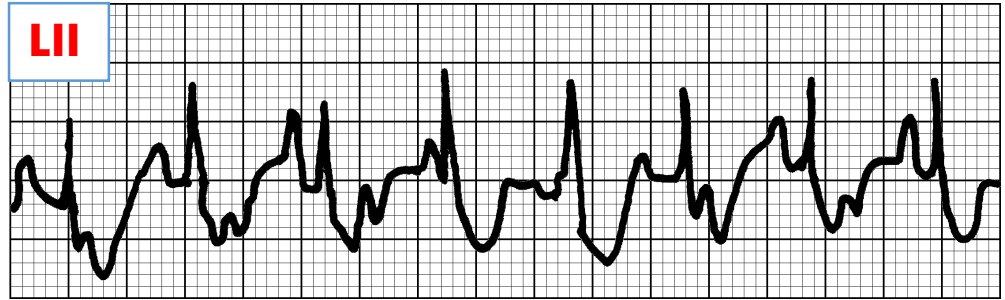


P wave

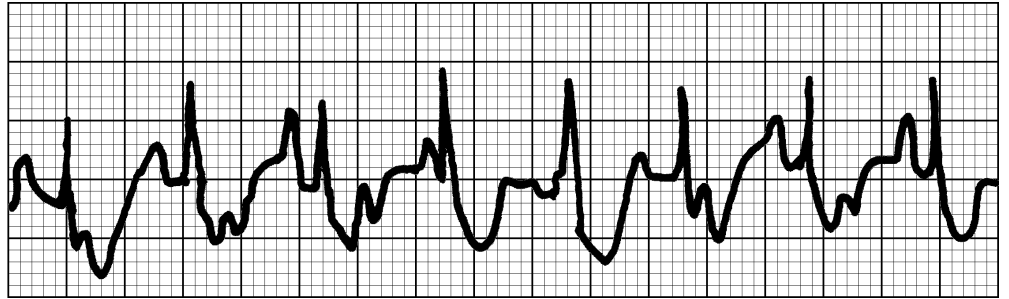


Inverted P waves

P wave



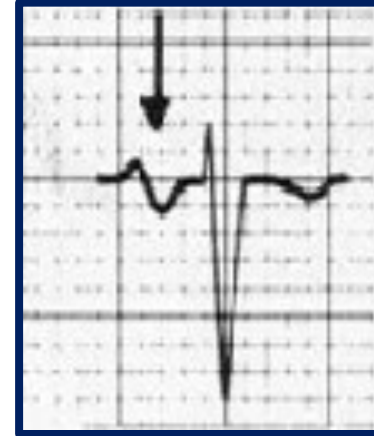
P wave



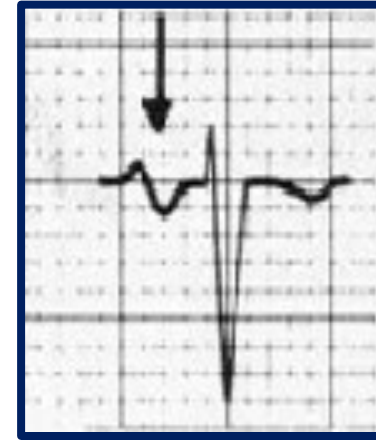
Multiple shape P wave in the same Lead



P wave



P wave



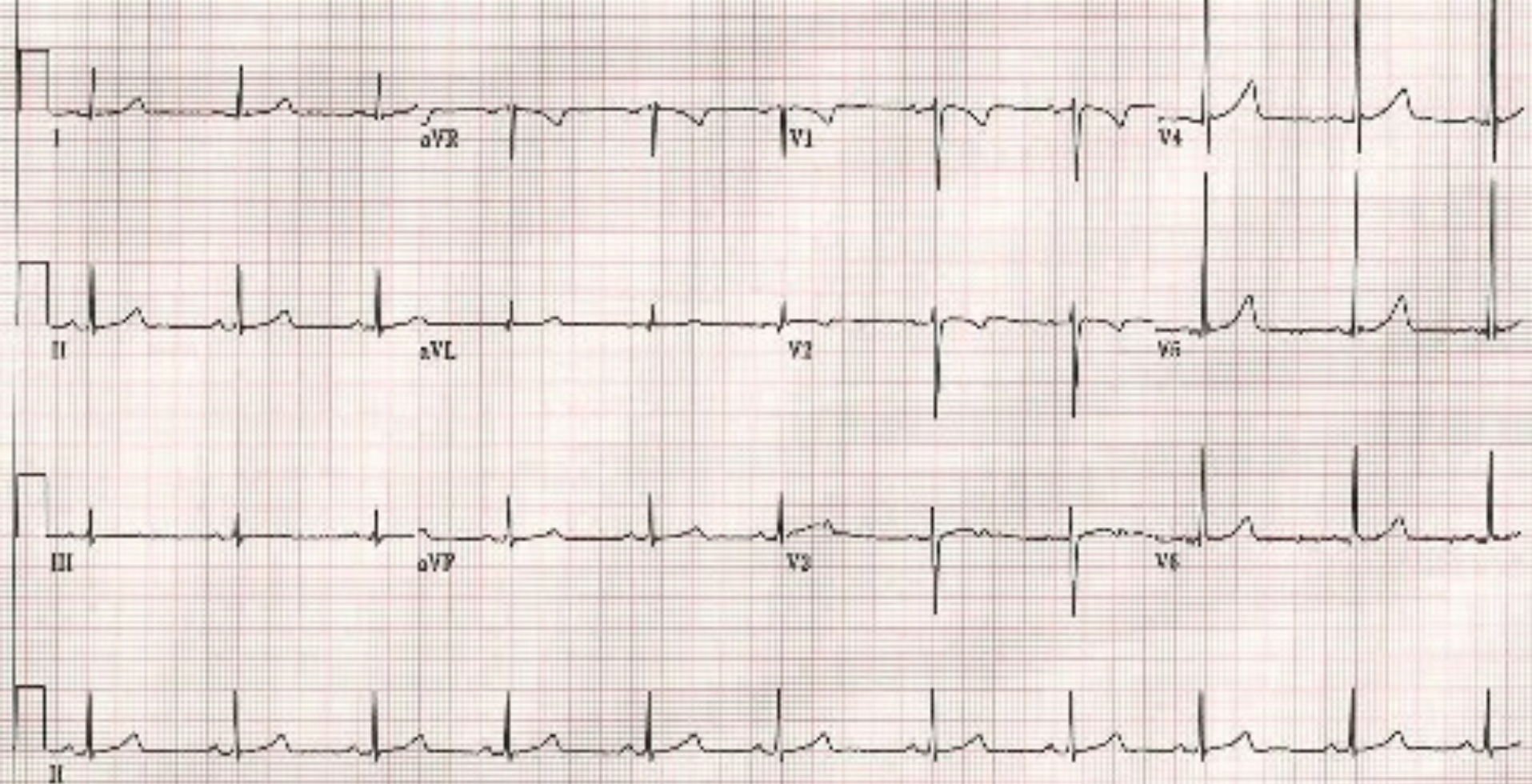
Increase P-Terminal force in V1

Test Yourself



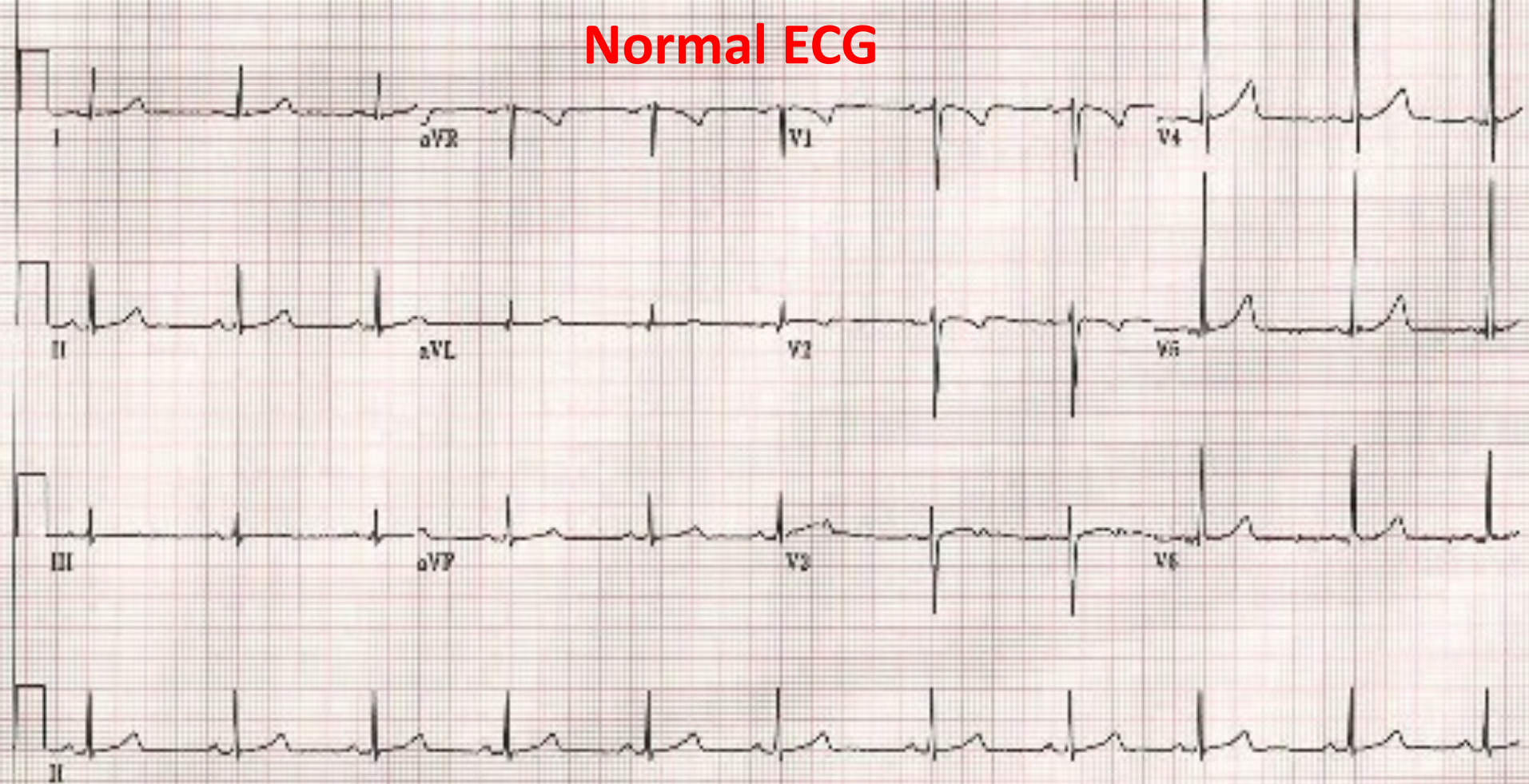
Comment on the P wave





- 1 Existence
- 2 Duration
- 3 Amplitude
- 4 Number
- 5 Dropped beats
- 7 Direction
- 6 Shape in the same lead
- 8 P- terminal Force in V1

Normal ECG



- 1 Existence
- 2 Duration
- 3 Amplitude
- 4 Number
- 5 Dropped beats
- 7 Direction
- 6 Shape in the same lead
- 8 P- terminal Force in V1

N

002-EC 100% 10mm



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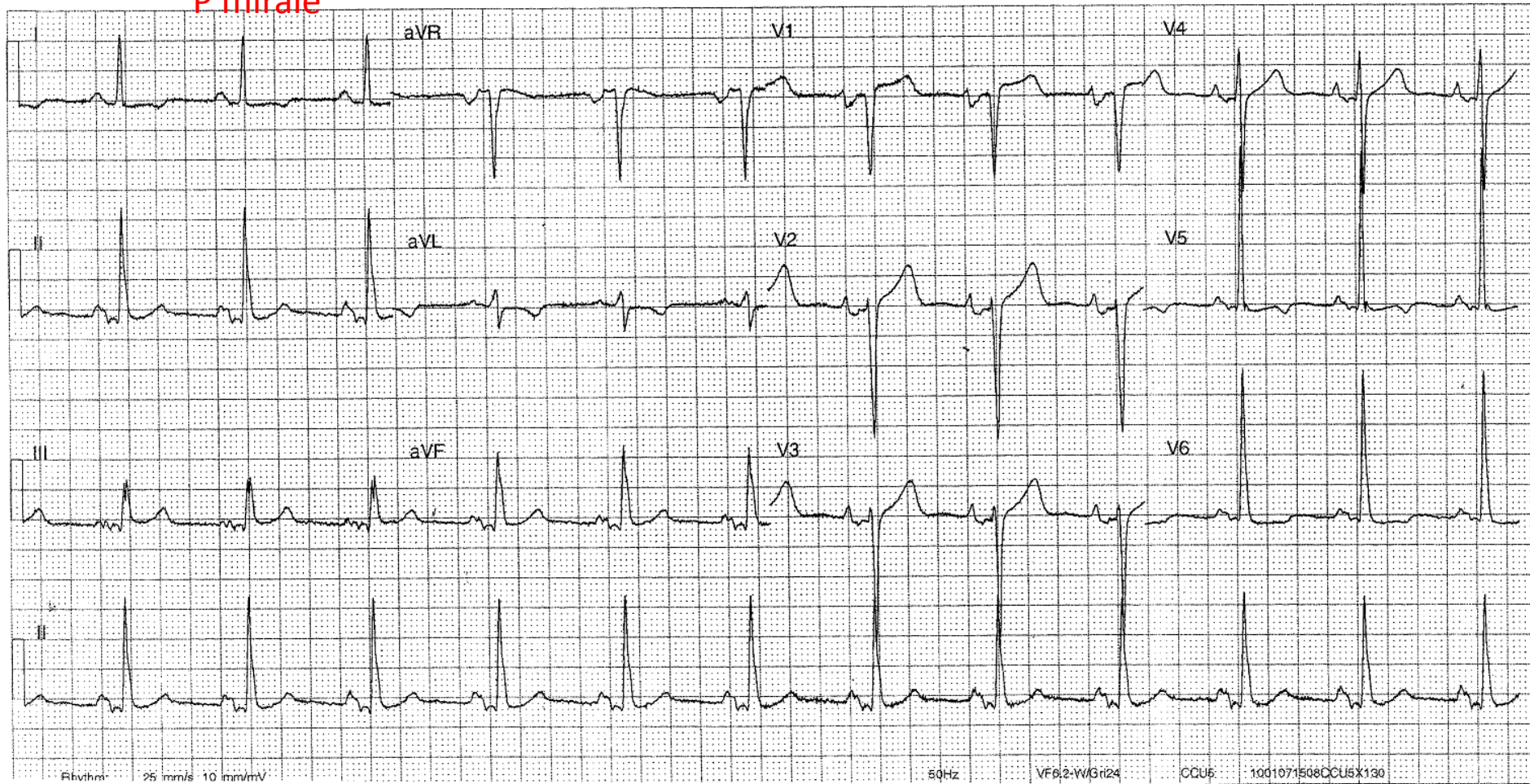
002-EC 10% 10mm



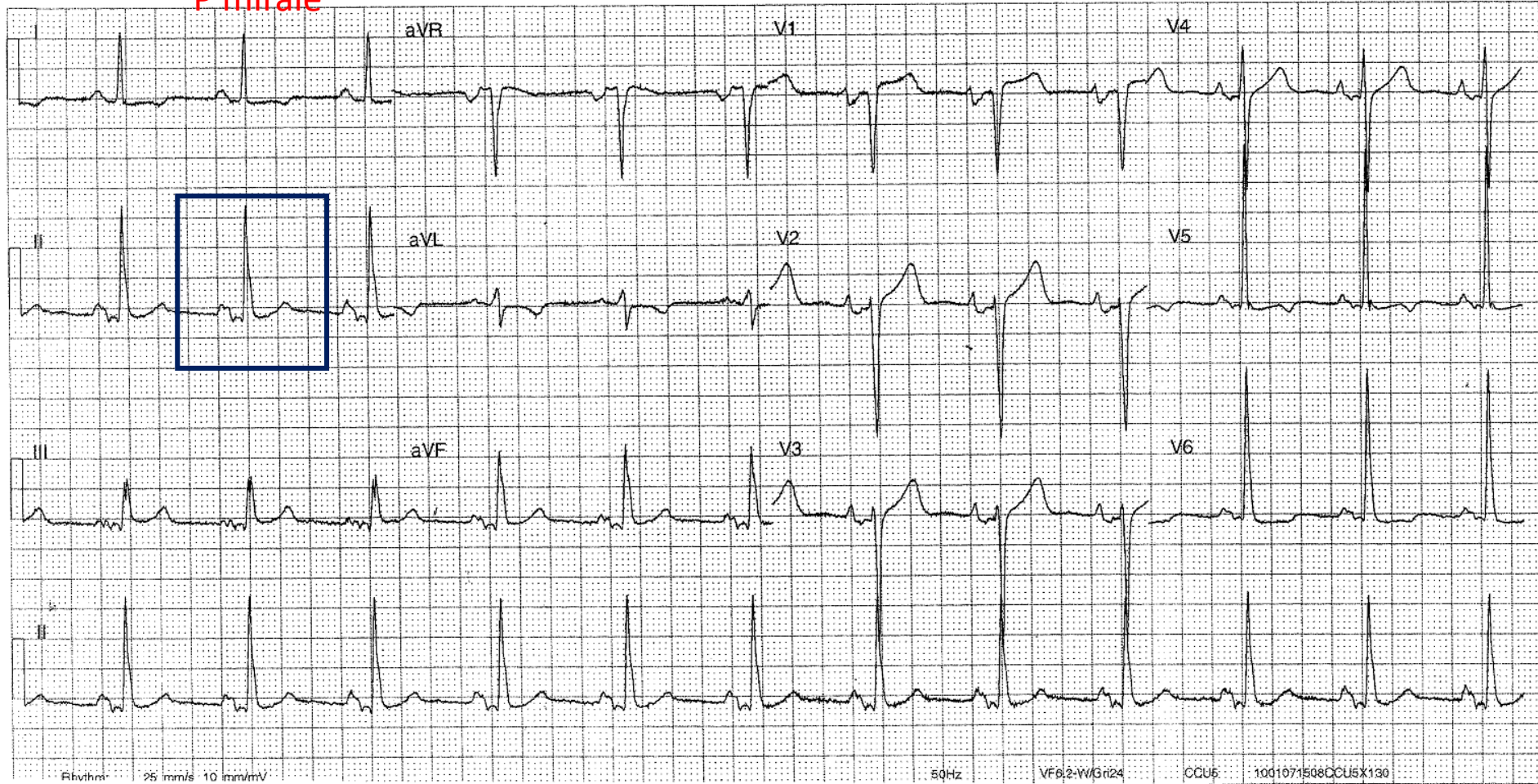
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Normal

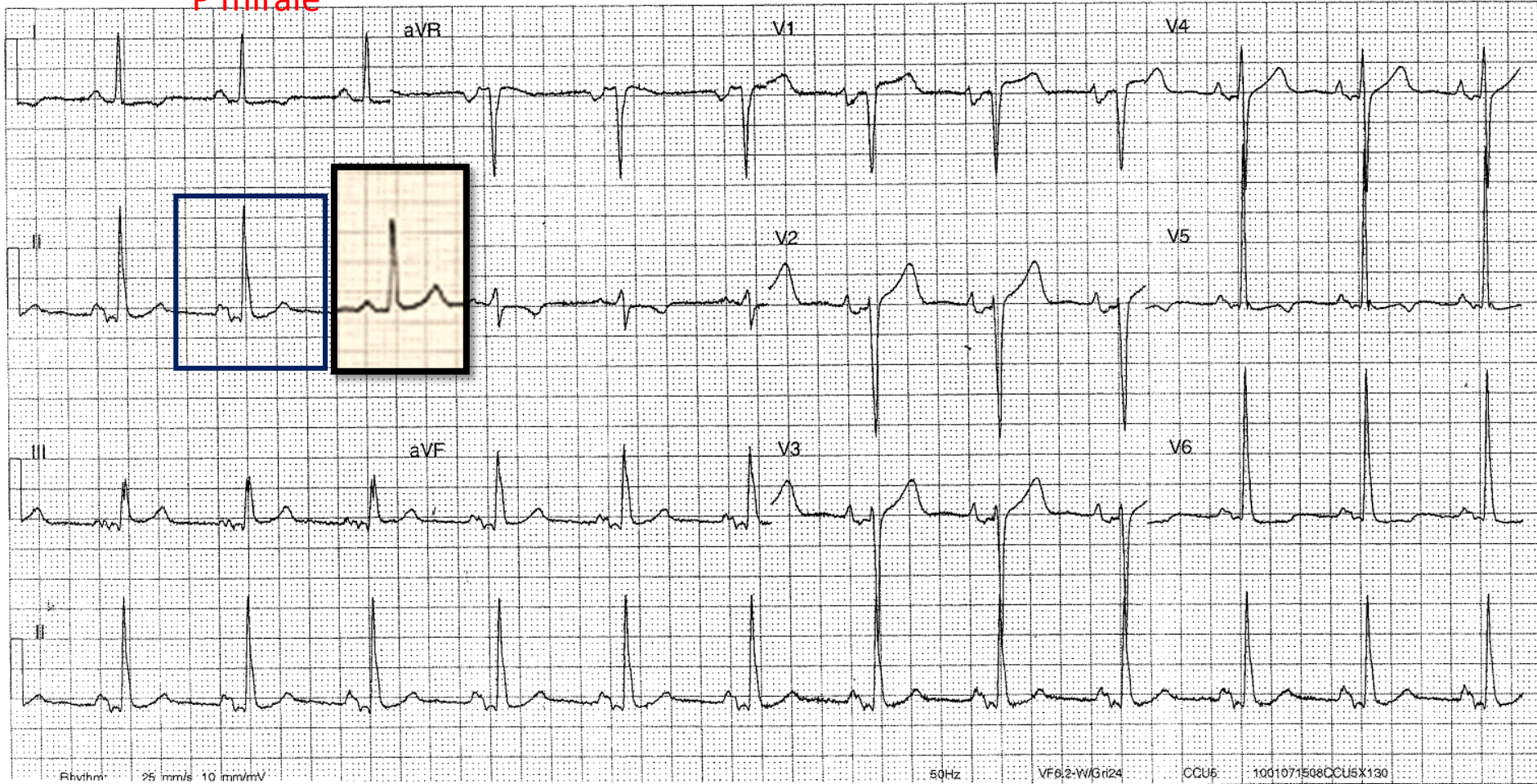
P mirale



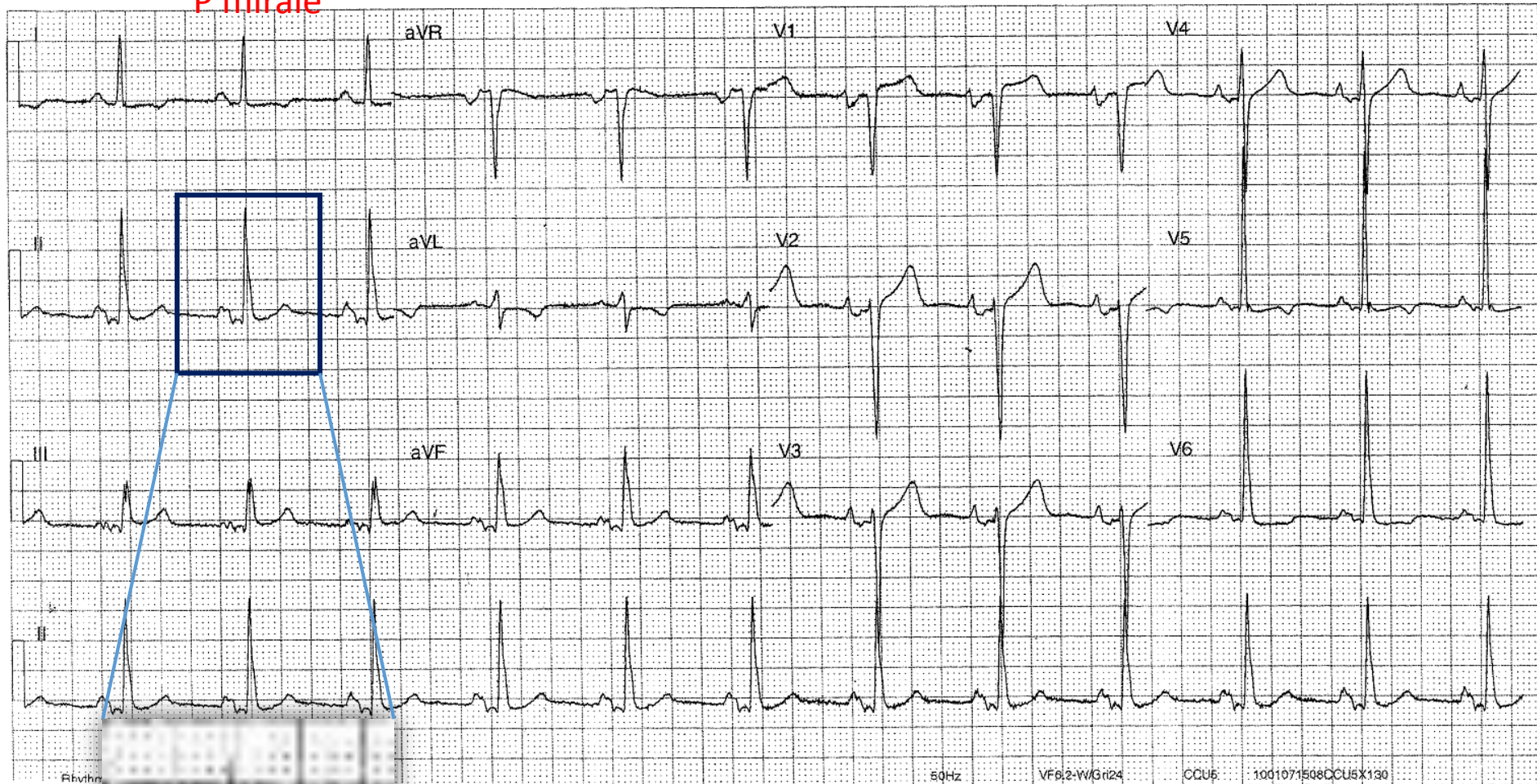
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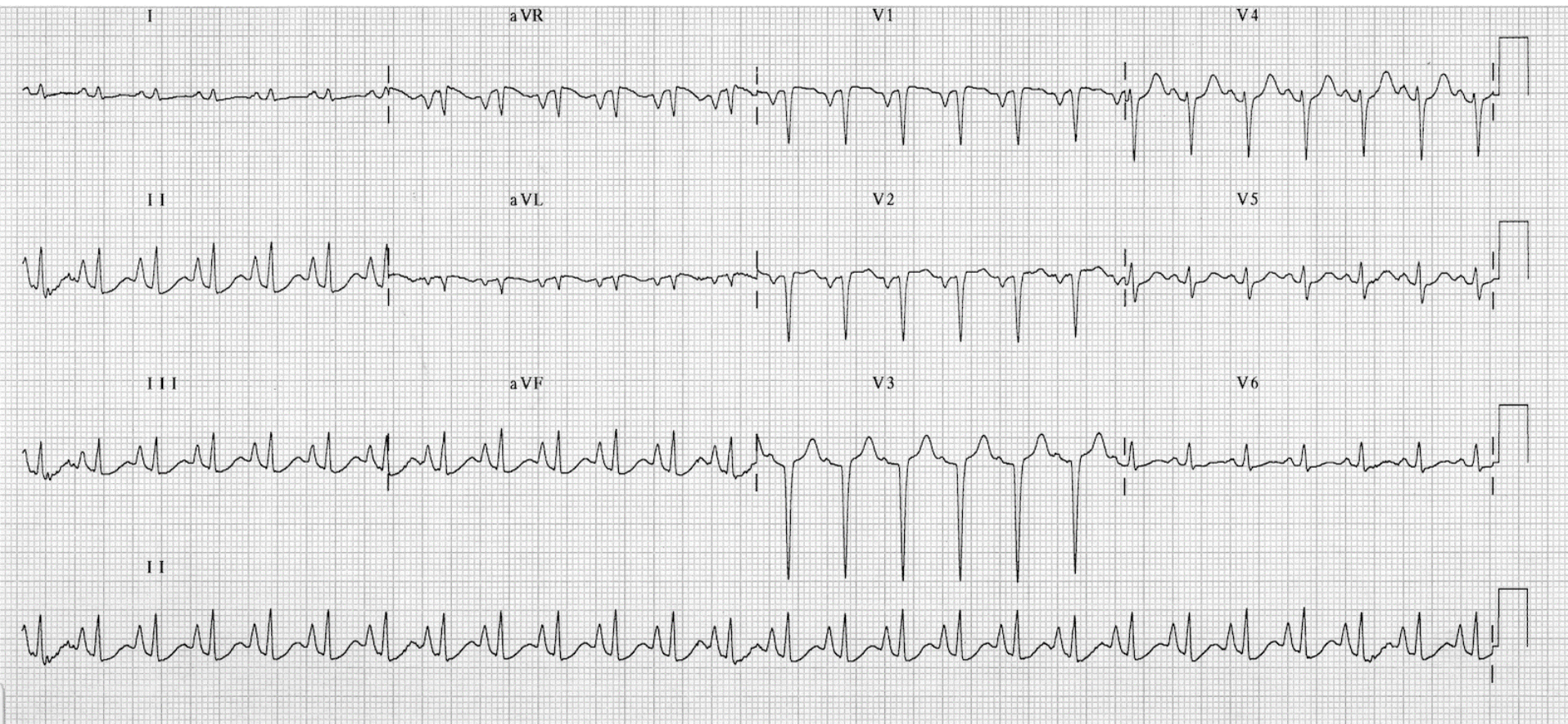
P mirale



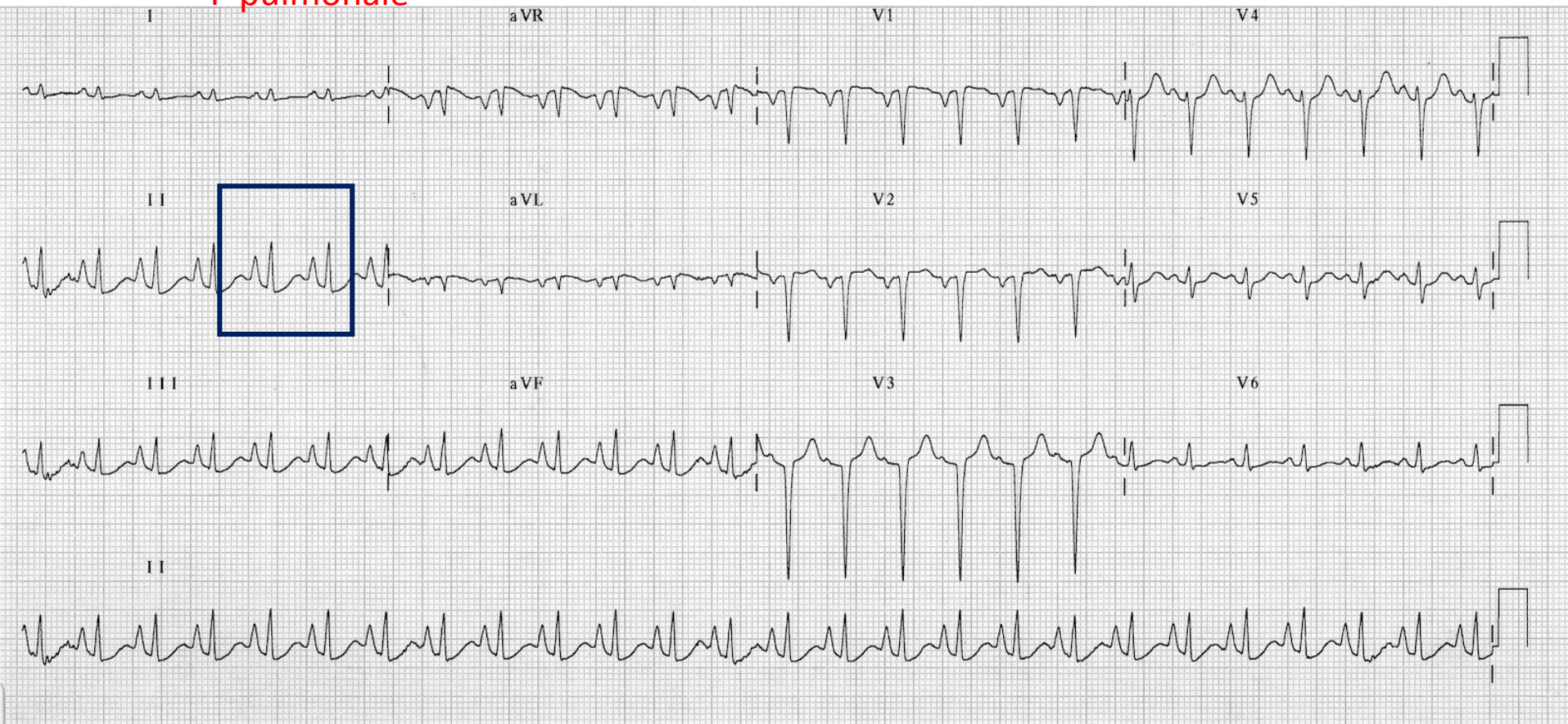
P mirale



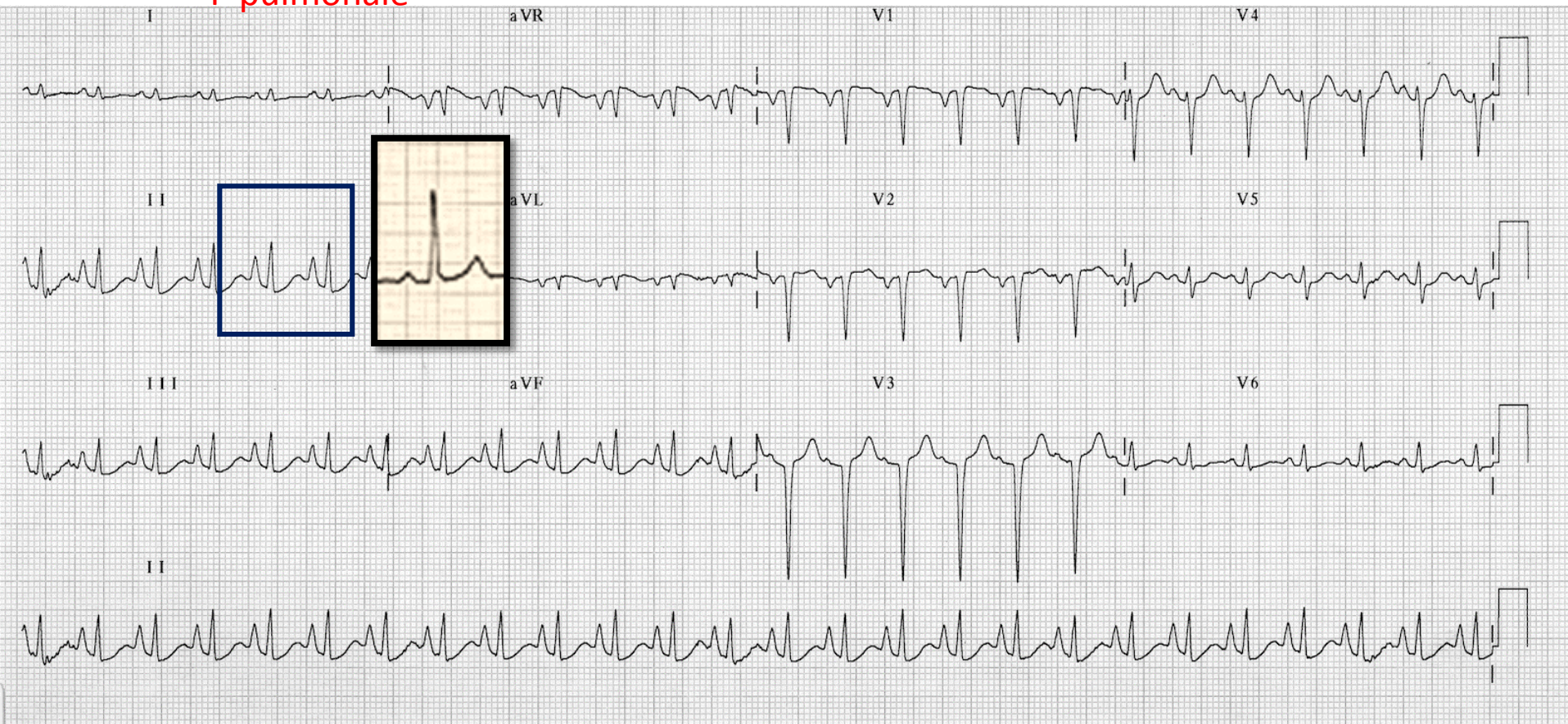
P pulmonale



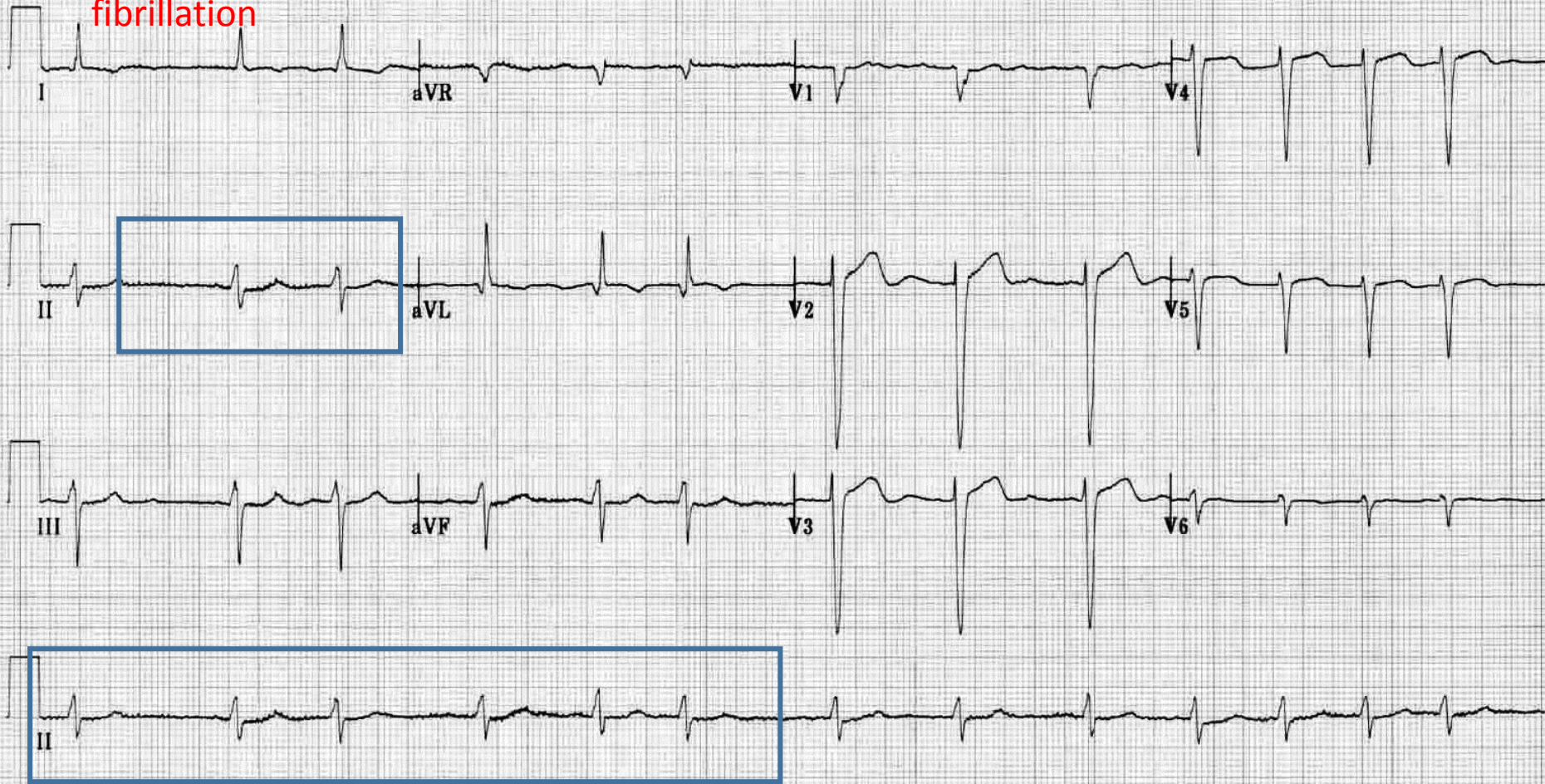
P pulmonale



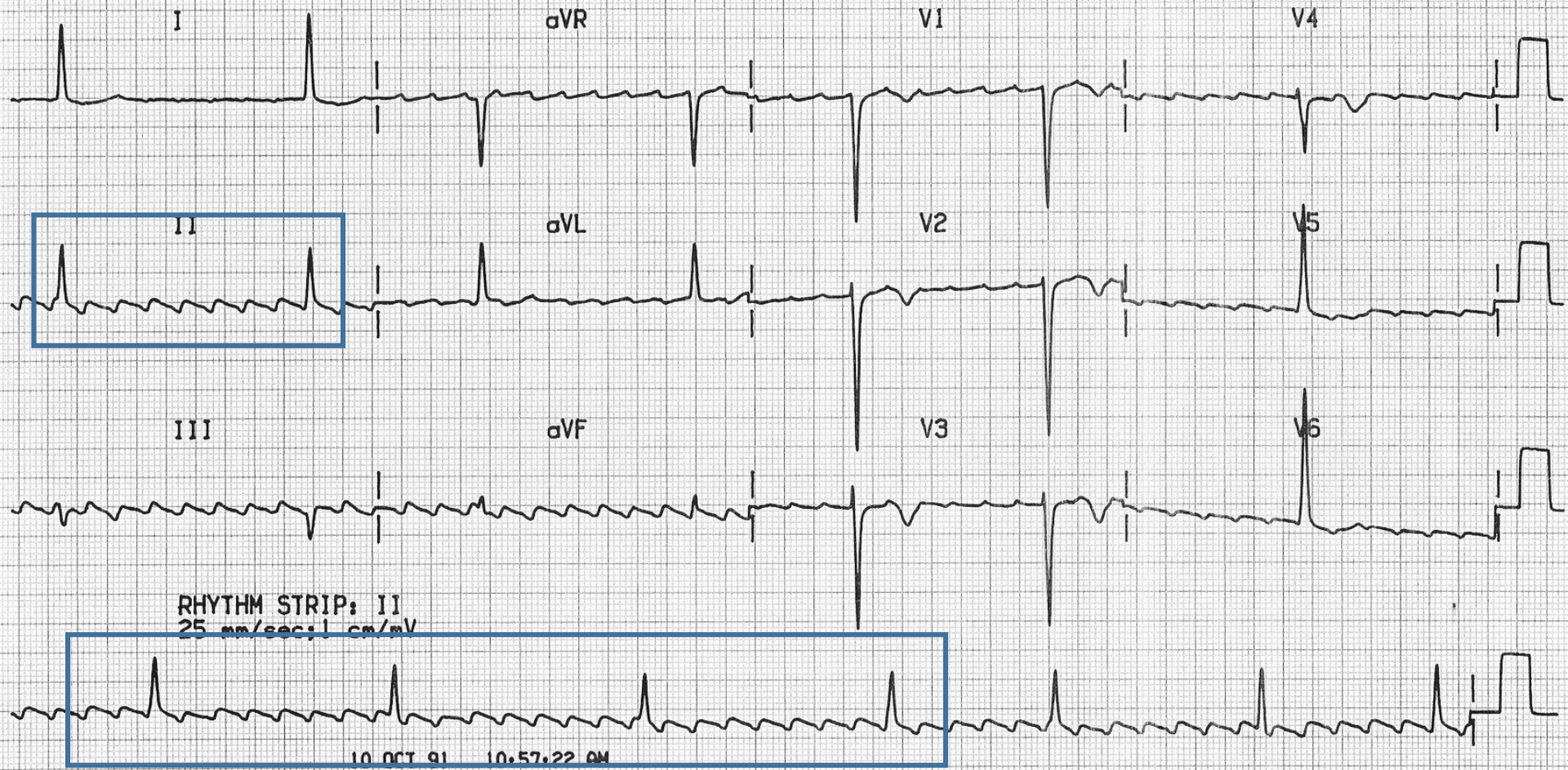
P pulmonale

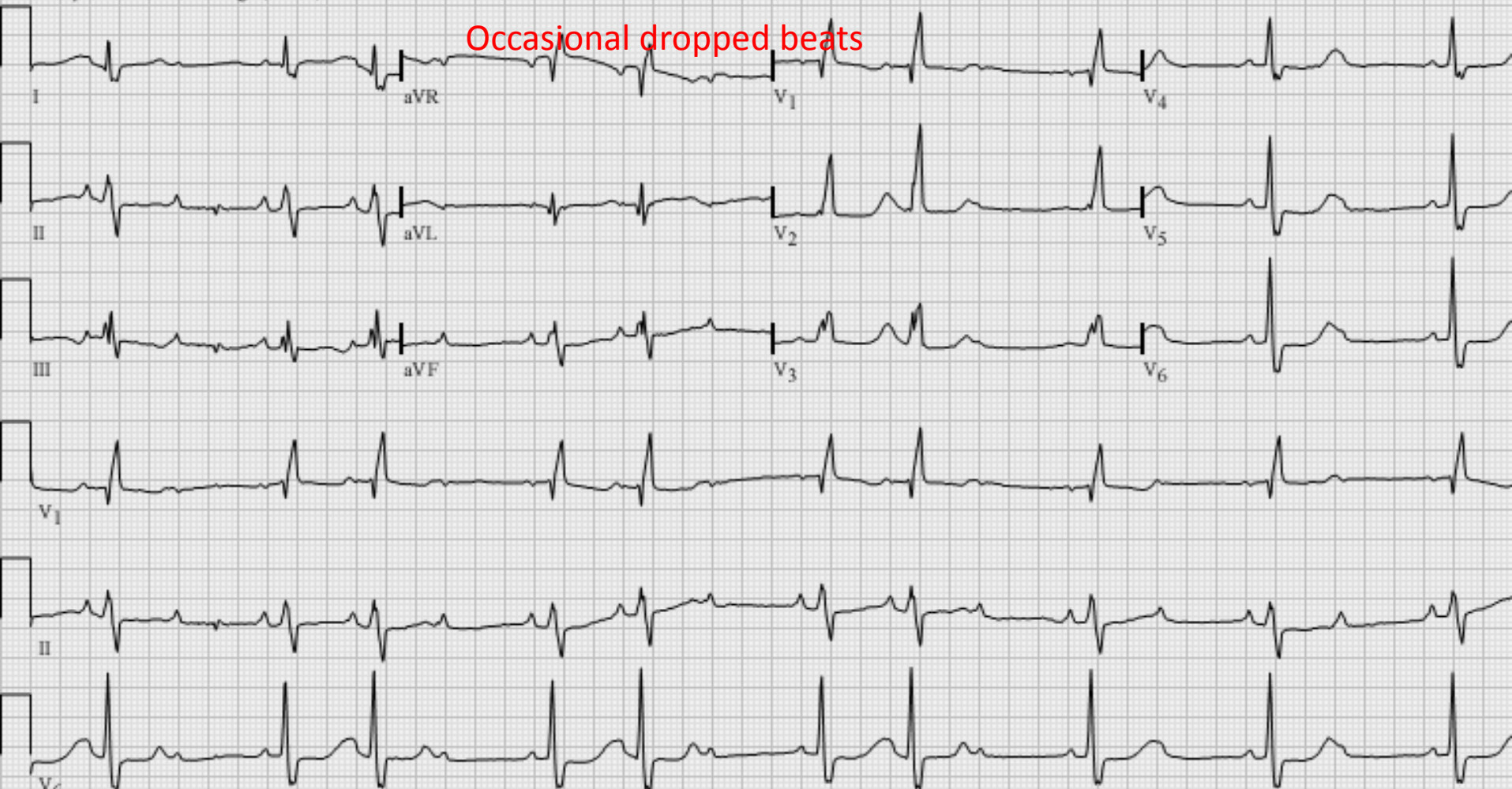


Atrial
fibrillation



Atrial flutter





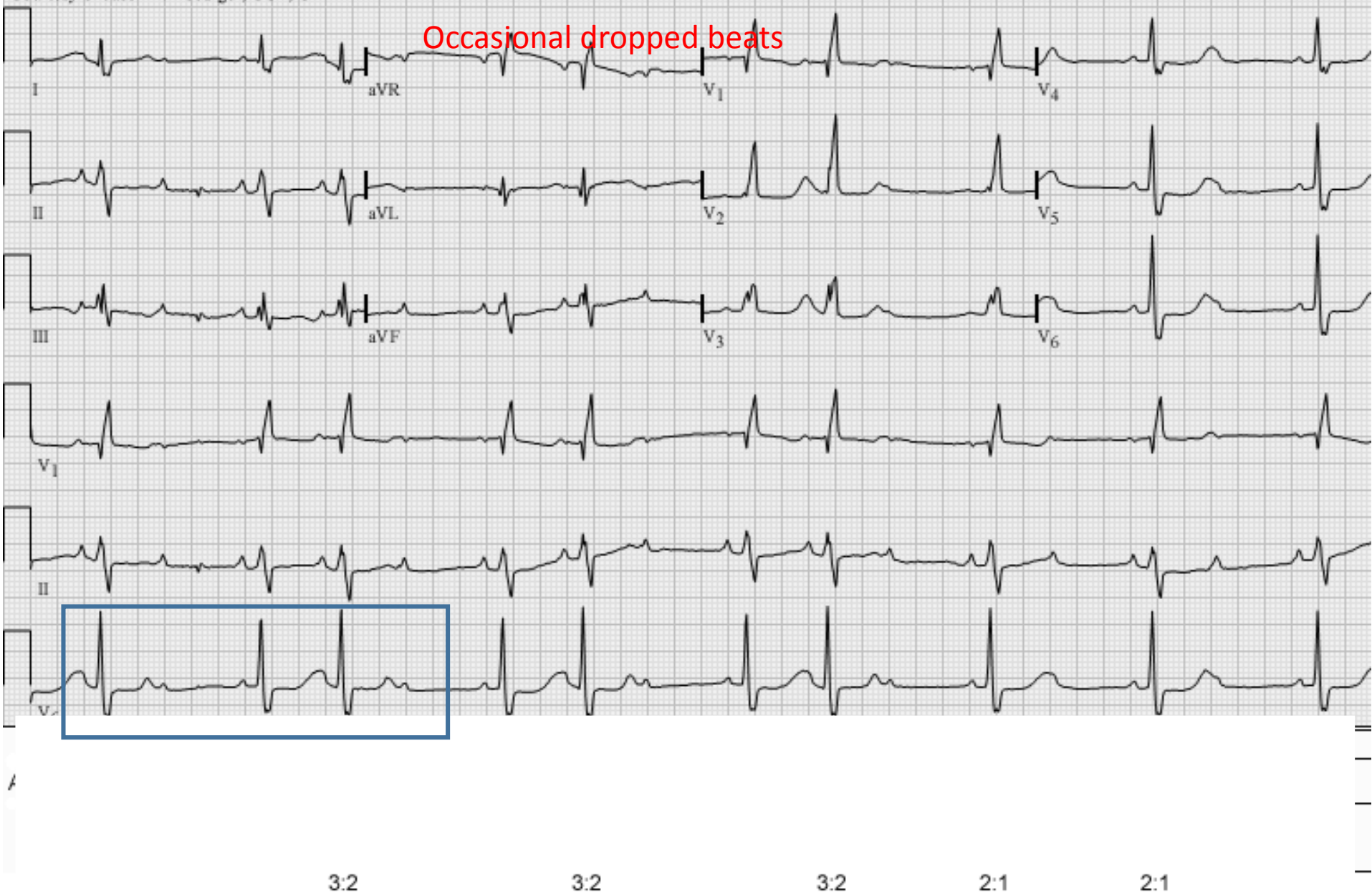
3:2

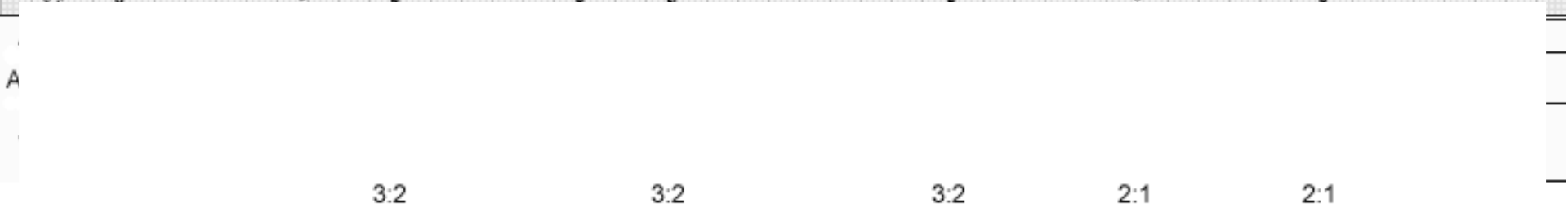
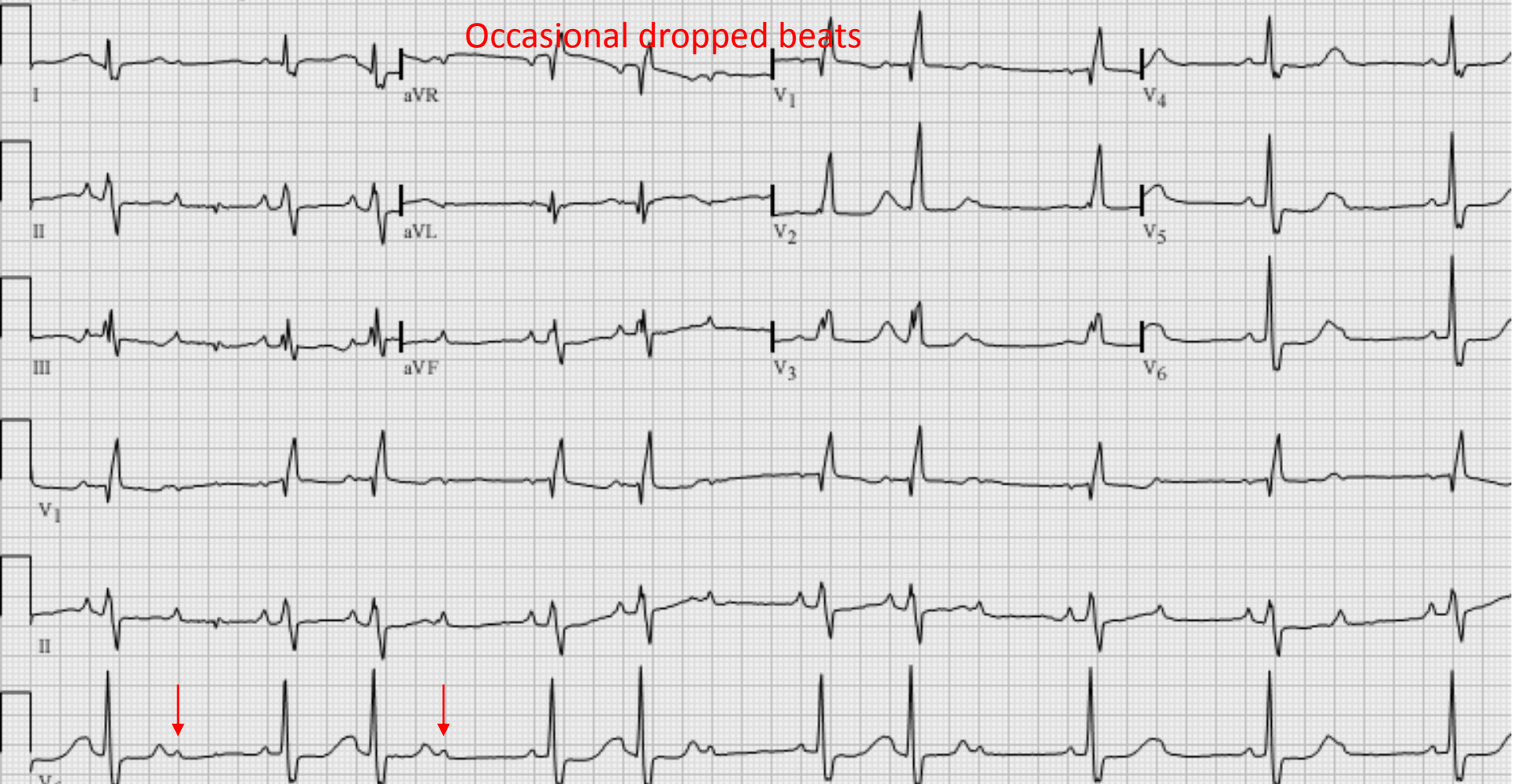
3:2

3:2

2:1

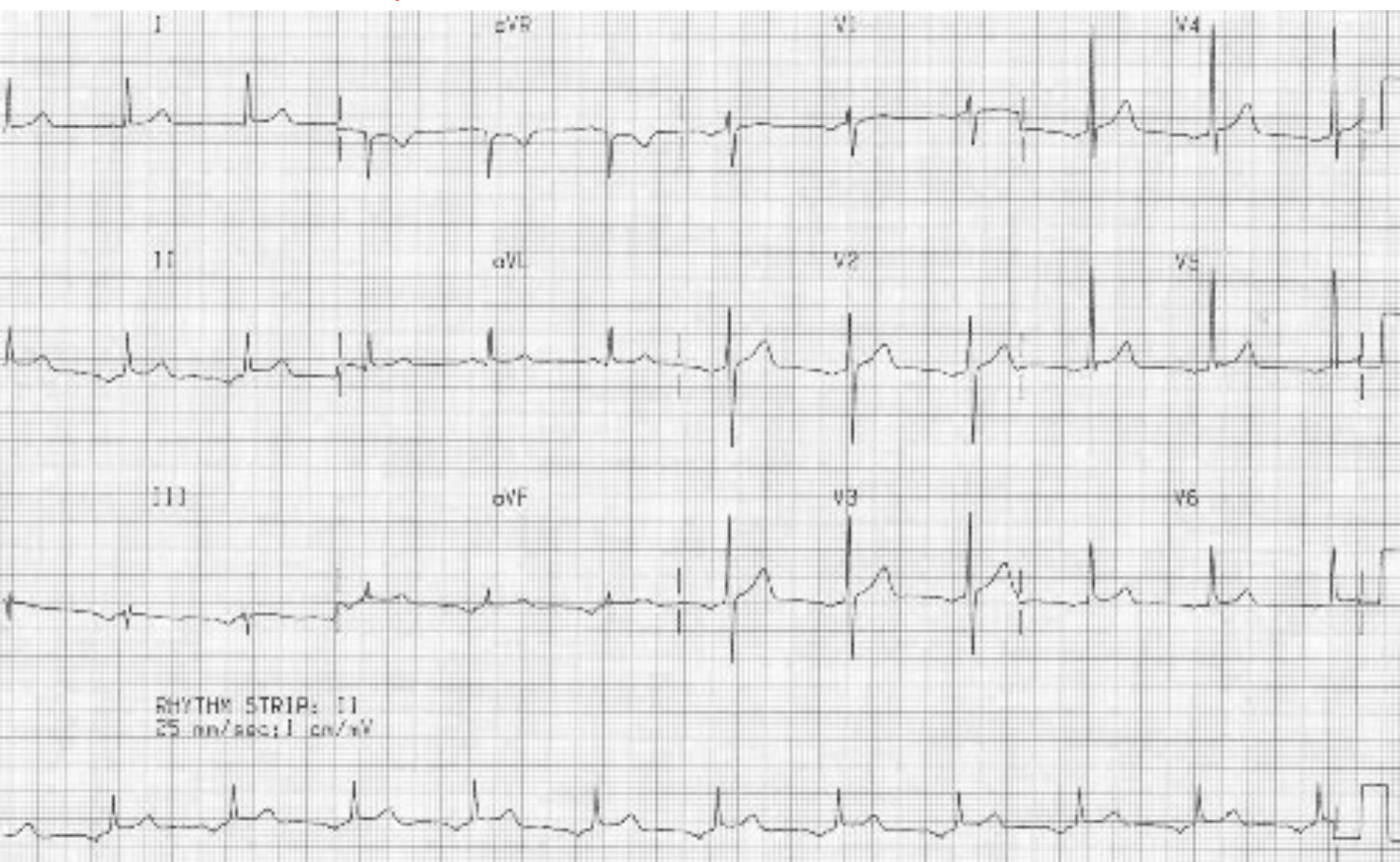
2:1



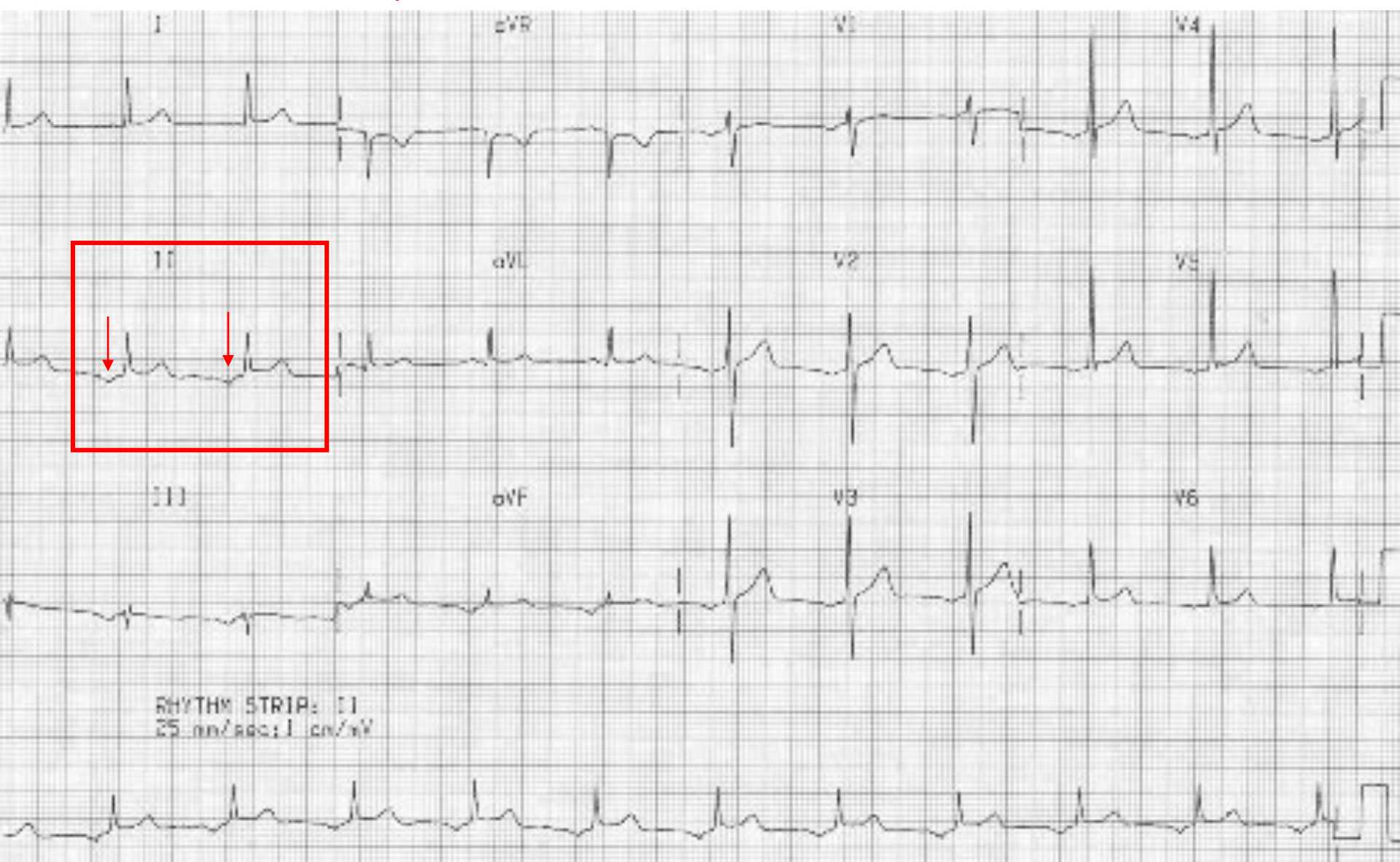


3:2 3:2 3:2 2:1 2:1

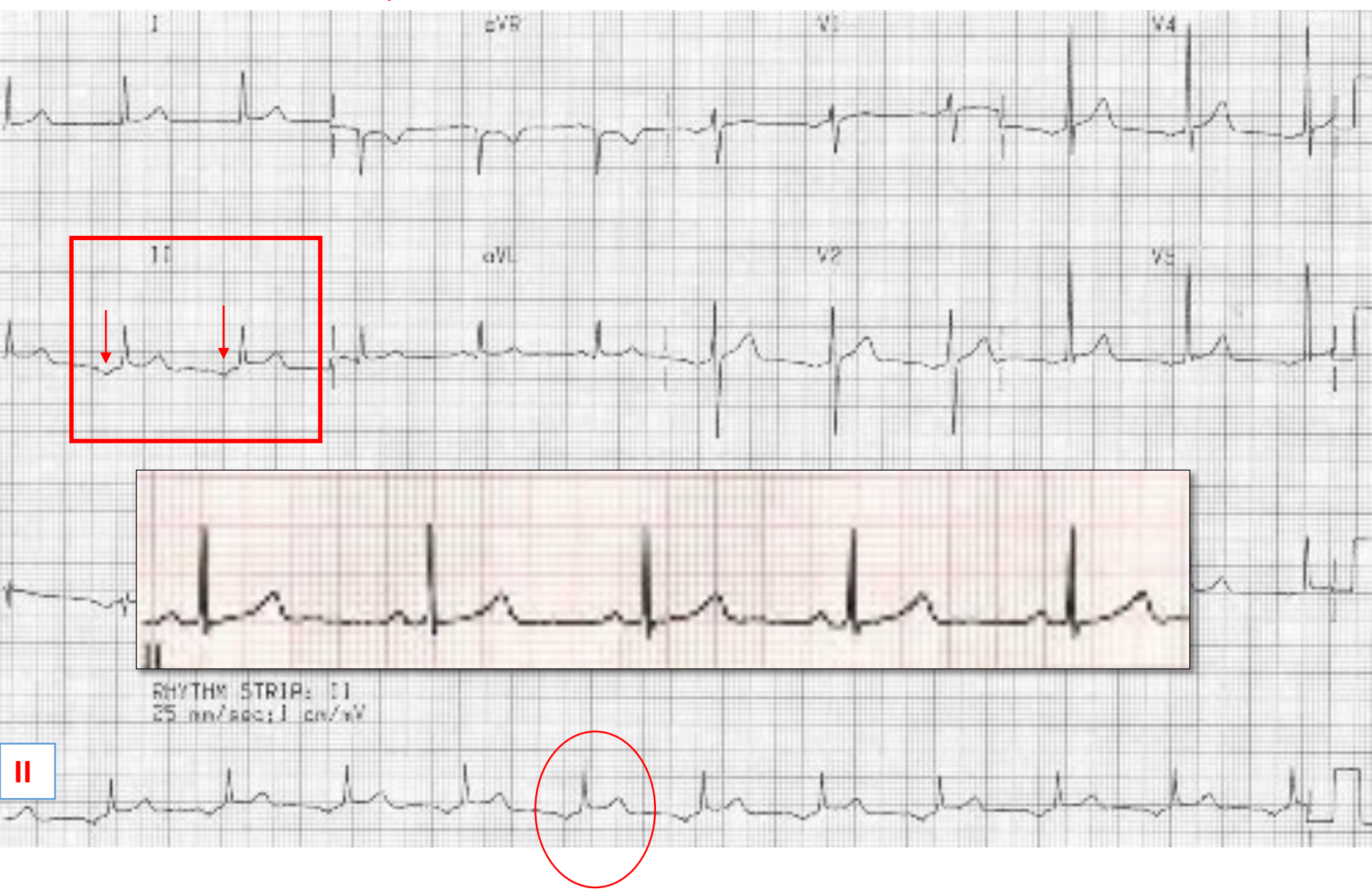
Inverted P waves Nodal Rhythm



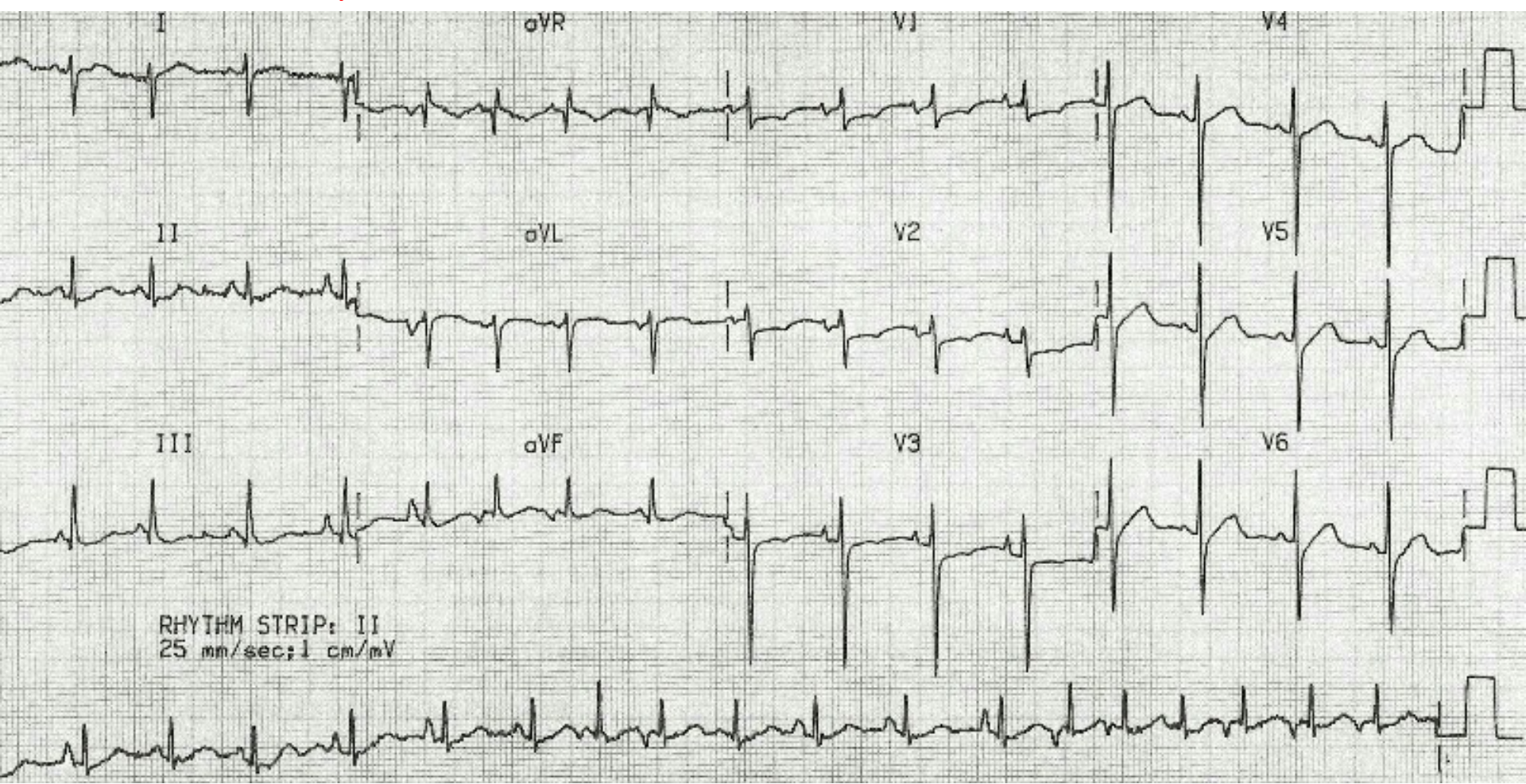
Inverted P waves Nodal Rhythm



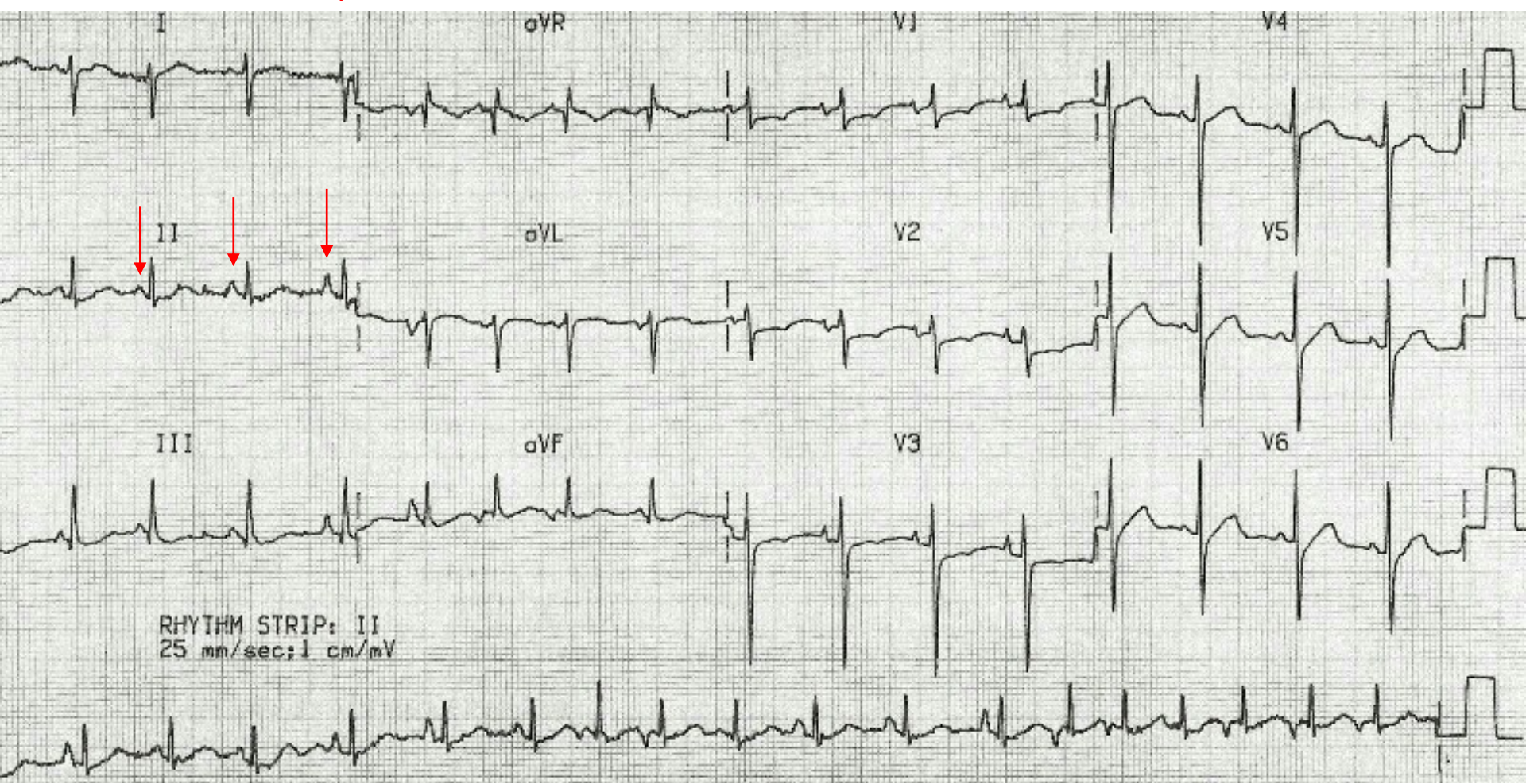
Inverted P waves Nodal Rhythm



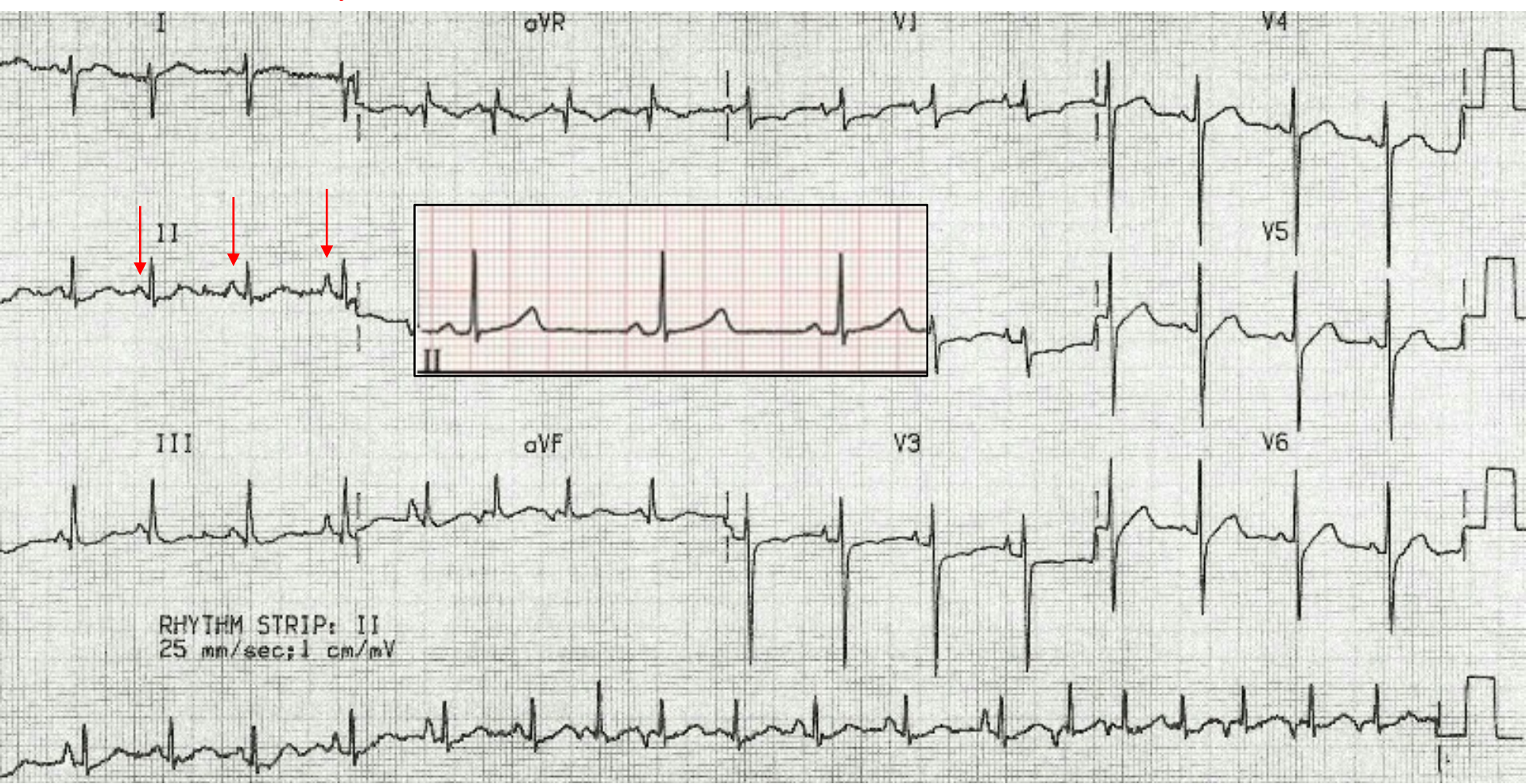
Multifocal atrial tachycardia



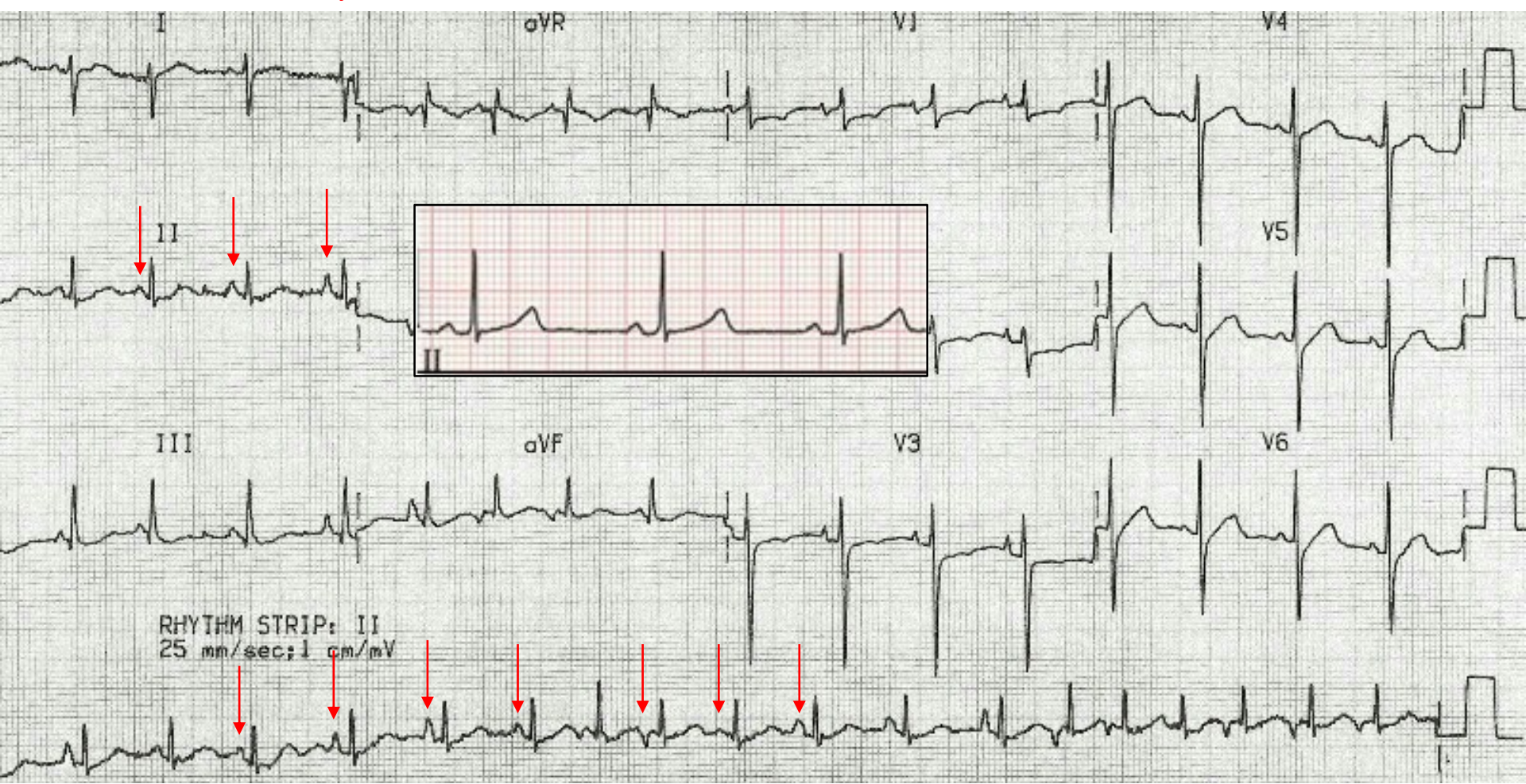
Multifocal atrial tachycardia



Multifocal atrial tachycardia



Multifocal atrial tachycardia

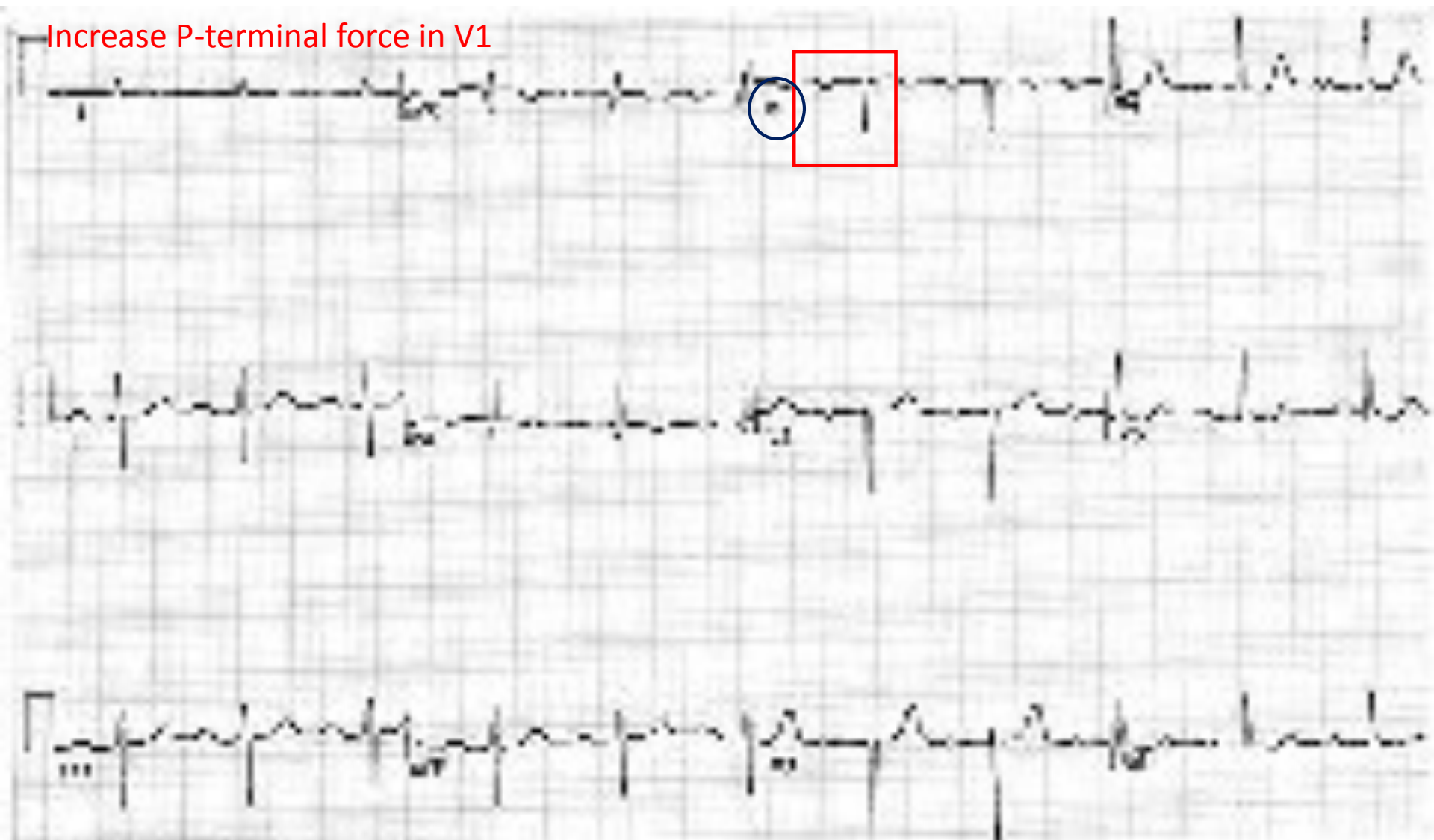


Increase P-terminal force in V1



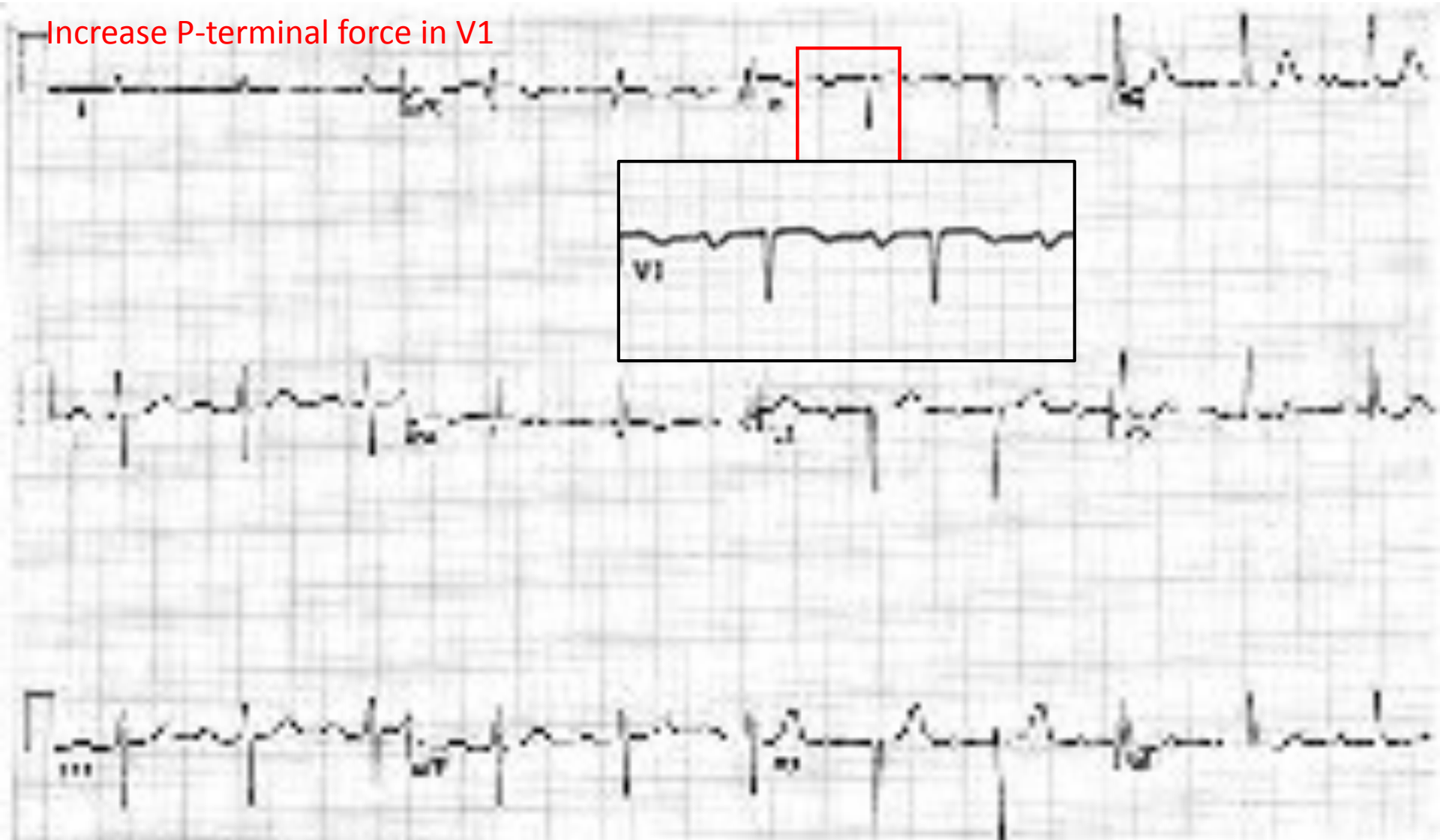
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Increase P-terminal force in V1



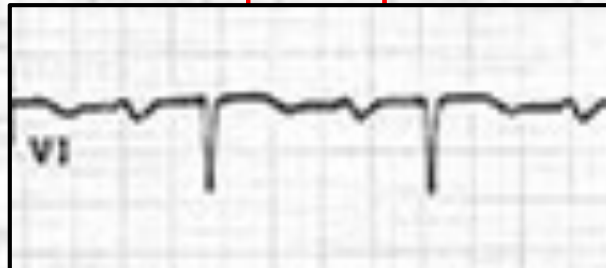
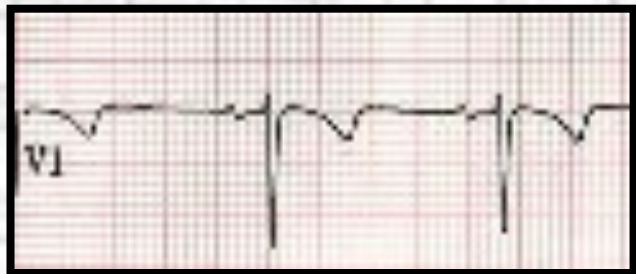
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Increase P-terminal force in V1



© 1997 Frank E. Yarnold, M.D.

Increase P-terminal force in V1



QRS - The Q Wave

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

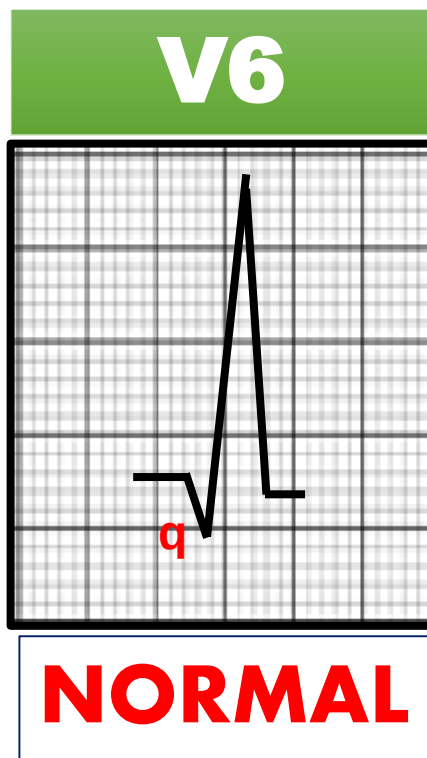
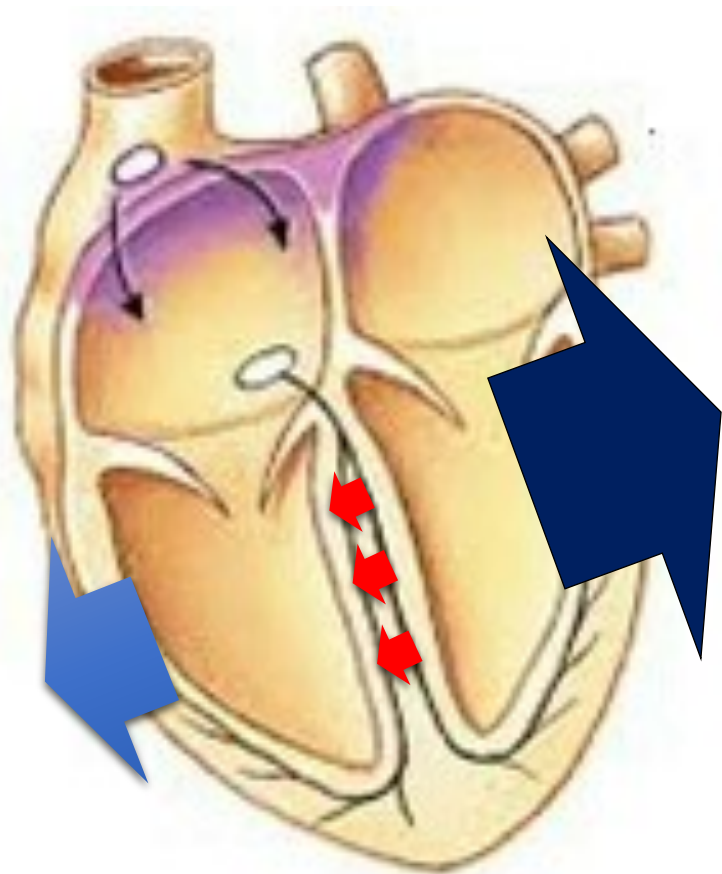
**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في هذا الموقع هم
تحت حماية قانون الملكية الفكرية و لا يحق لأحد إستخدامه أو إستنساخه أو
تحميله على أى كمبيوتر أو إعادة طبعه أو طبع أجزاء منه بدون إذن مسبق من
الدكتور طارق عبد الحميد (أو من ينوب عنه قانونياً) . و من يتعدى على
الملكية الفكرية المذكورة فسوف يتعرض للمسائلة القضائية عن جريمة إنتهاك
حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول
فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص برجاء
الإتصال بالدكتور طارق عبد الحميد

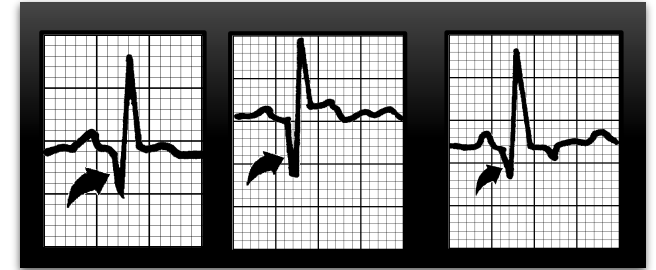
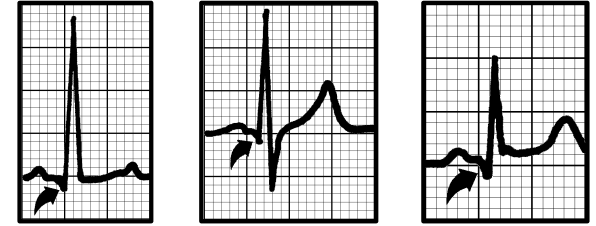
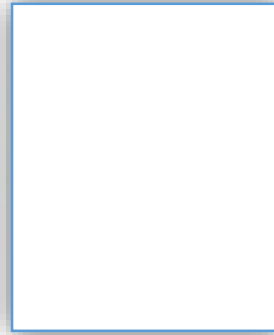
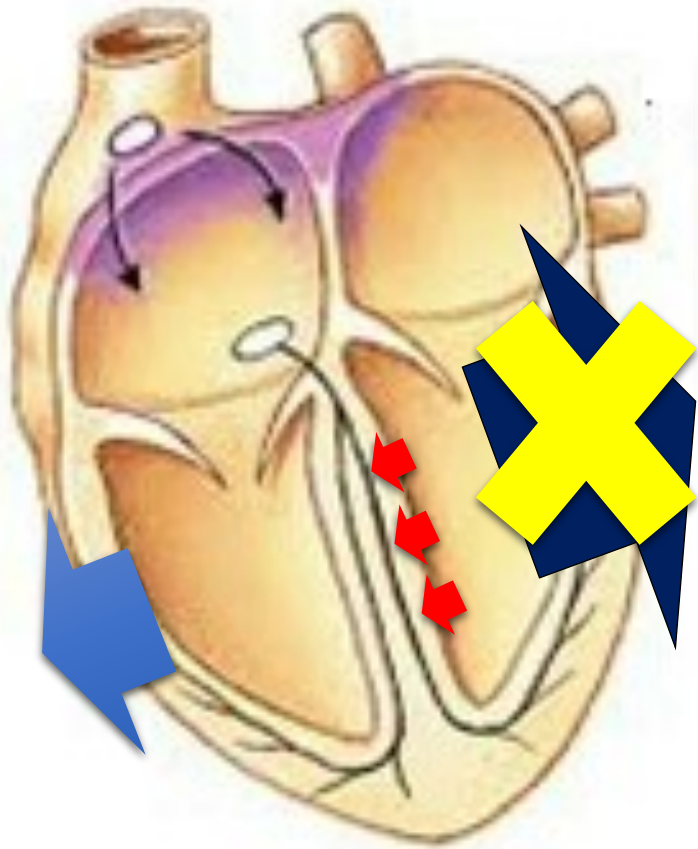


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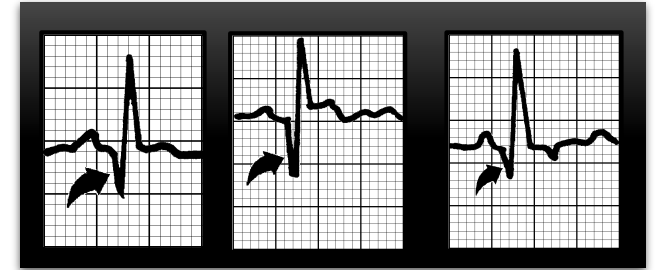
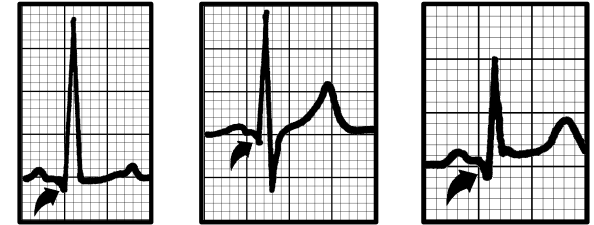
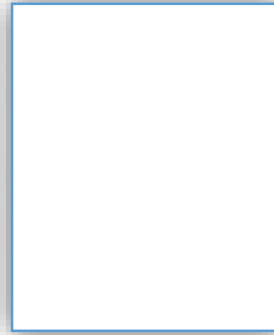
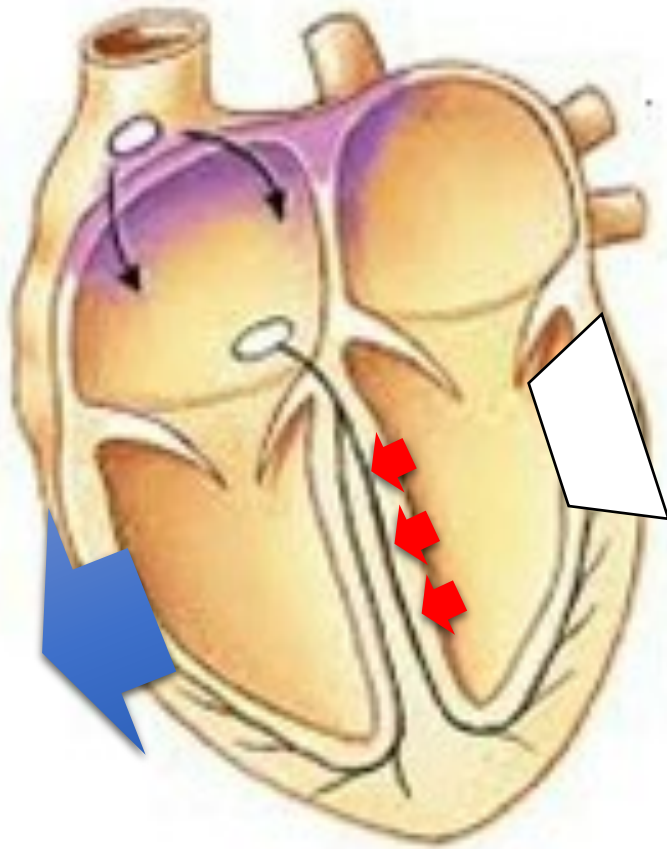
Q Wave



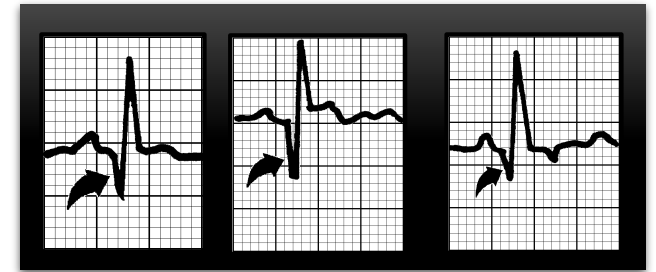
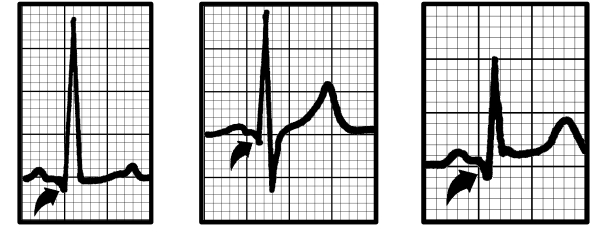
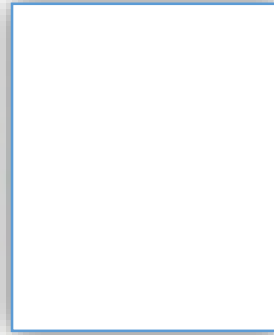
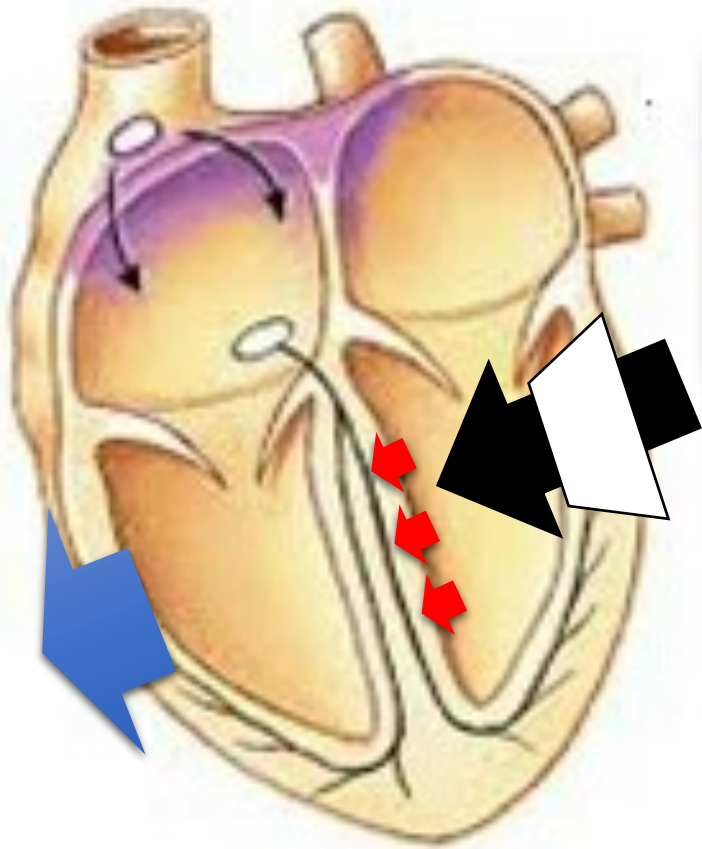
The formation of Pathological Q waves



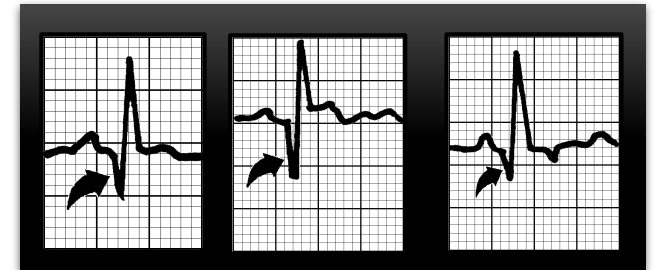
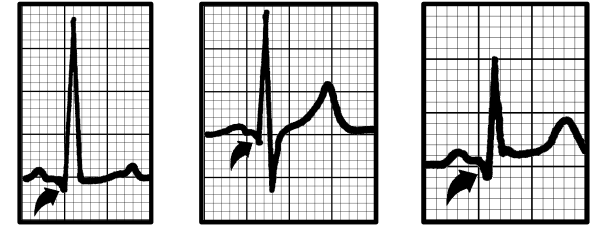
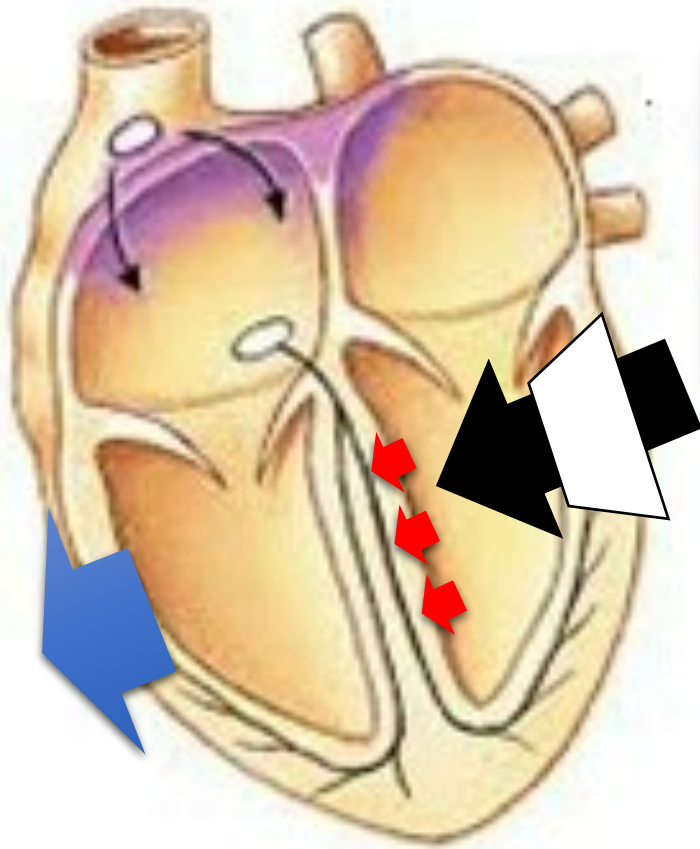
The formation of Pathological Q waves



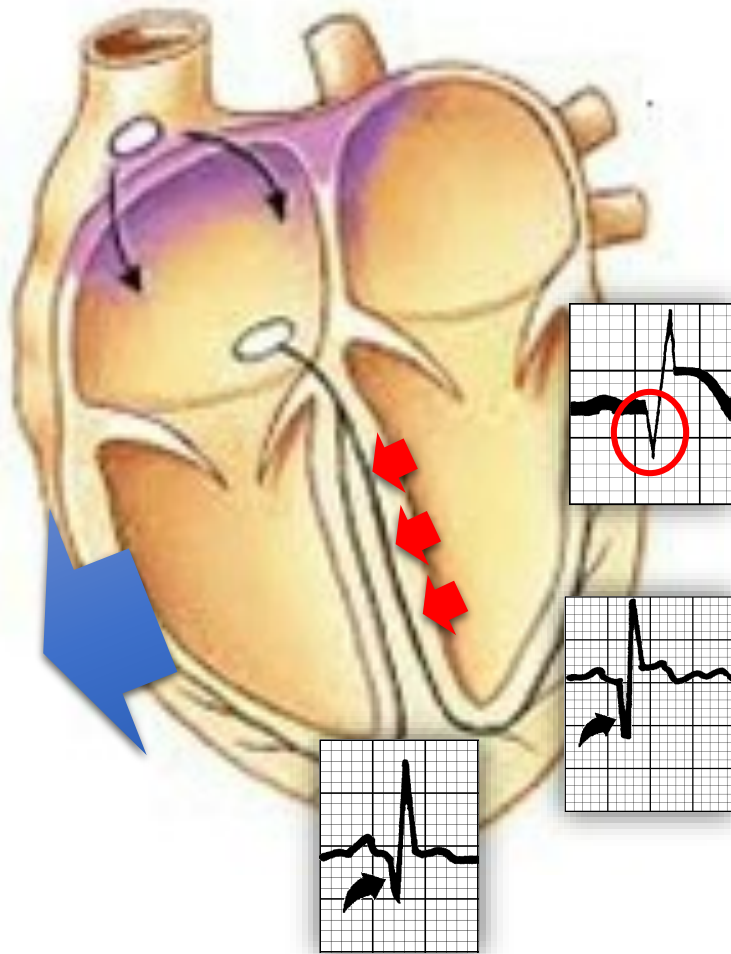
The formation of Q waves



The formation of Q waves



The Criteria of Q waves

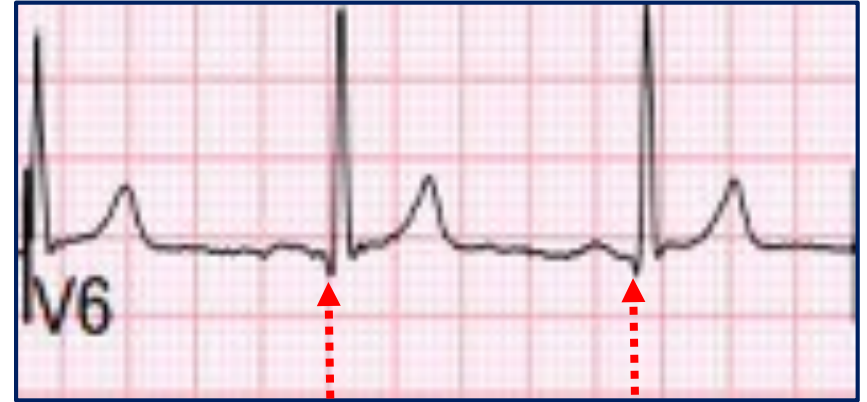


- ① More than 1 small square in width**
- ② Amplitude is at least 25% of the following R**
- ③ Appears in multiple leads corresponding to a certain cardiac segment (rather than a single lead)**
- ④ Appears in leads where q waves are typically absent (Normally you can see q wave in V6, aVL, and LI)**
- ⑤ Appearance of new q waves in the ECG record of the same patient**

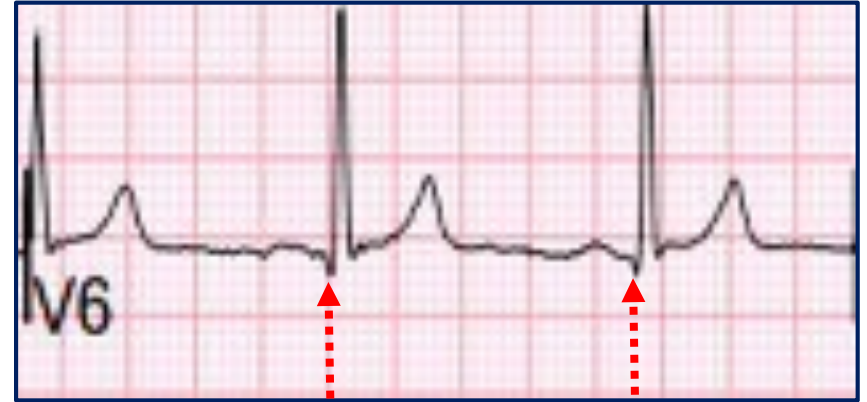


**Let us revise
the Q wave**

QRS Complex: Q Wave



QRS Complex: Q Wave



Normal septal q wave

QRS Complex: Q Wave



AMI (Anterior Wall)

V1

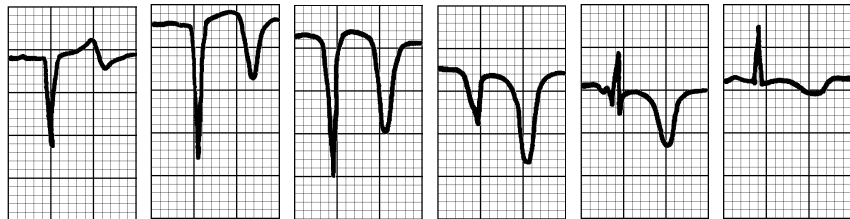
V2

V3

V4

V5

V6



QRS Complex: Q Wave



AMI (Anterior Wall)

V1

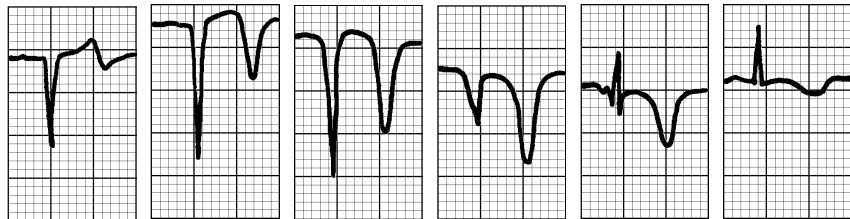
V2

V3

V4

V5

V6



QRS Complex: Q Wave



AMI (Anterior Wall)

V1

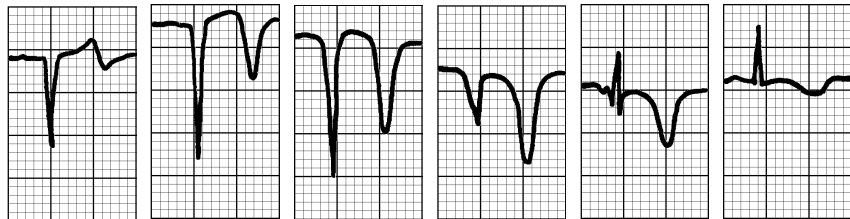
V2

V3

V4

V5

V6



QRS Complex: Q Wave



AMI (Anterior Wall)

V1

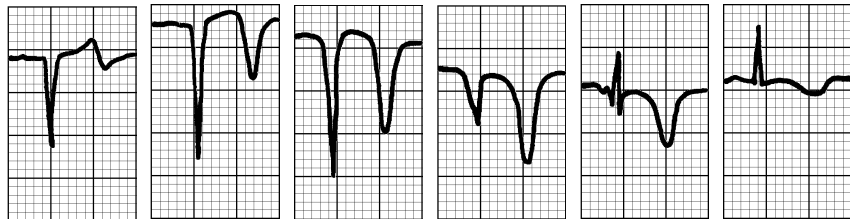
V2

V3

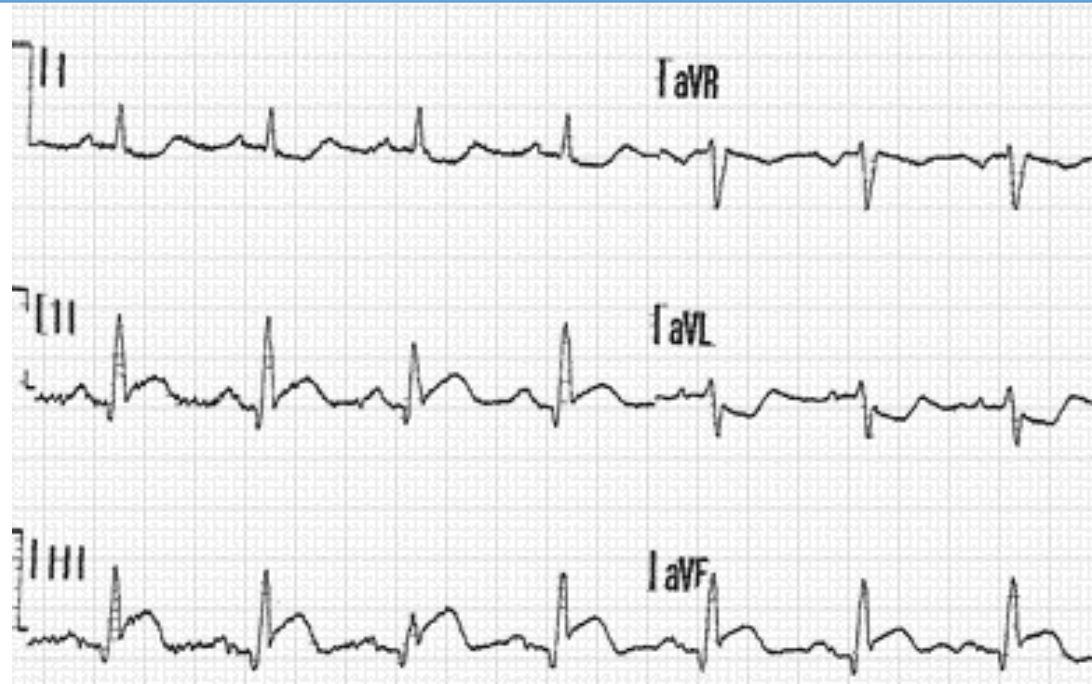
V4

V5

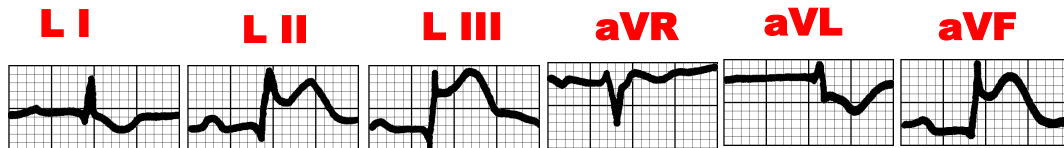
V6



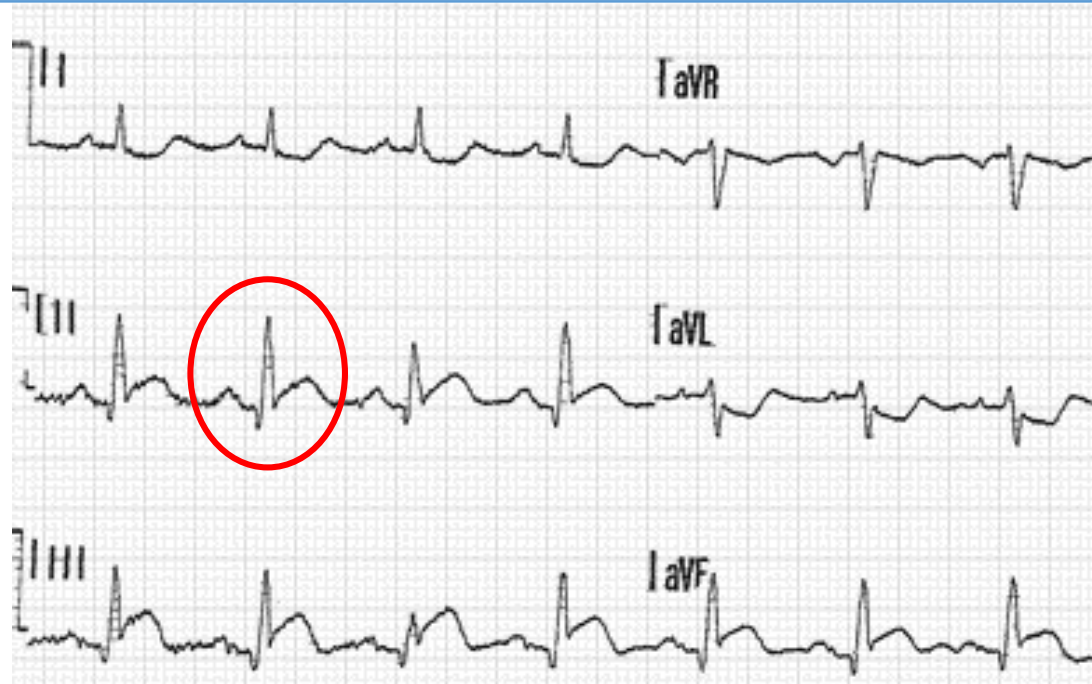
QRS Complex: Q Wave



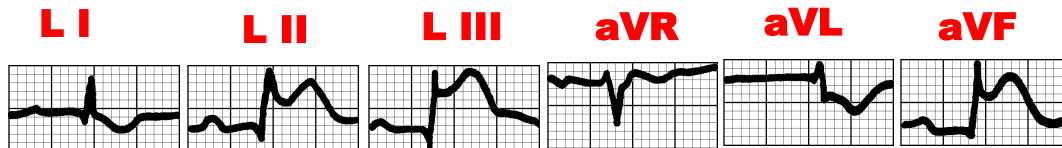
Inferior Wall Myocardial Infarction



QRS Complex: Q Wave



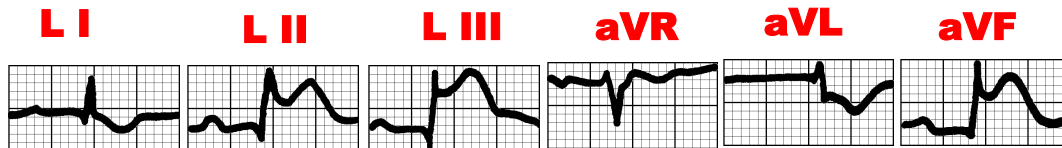
Inferior Wall Myocardial Infarction



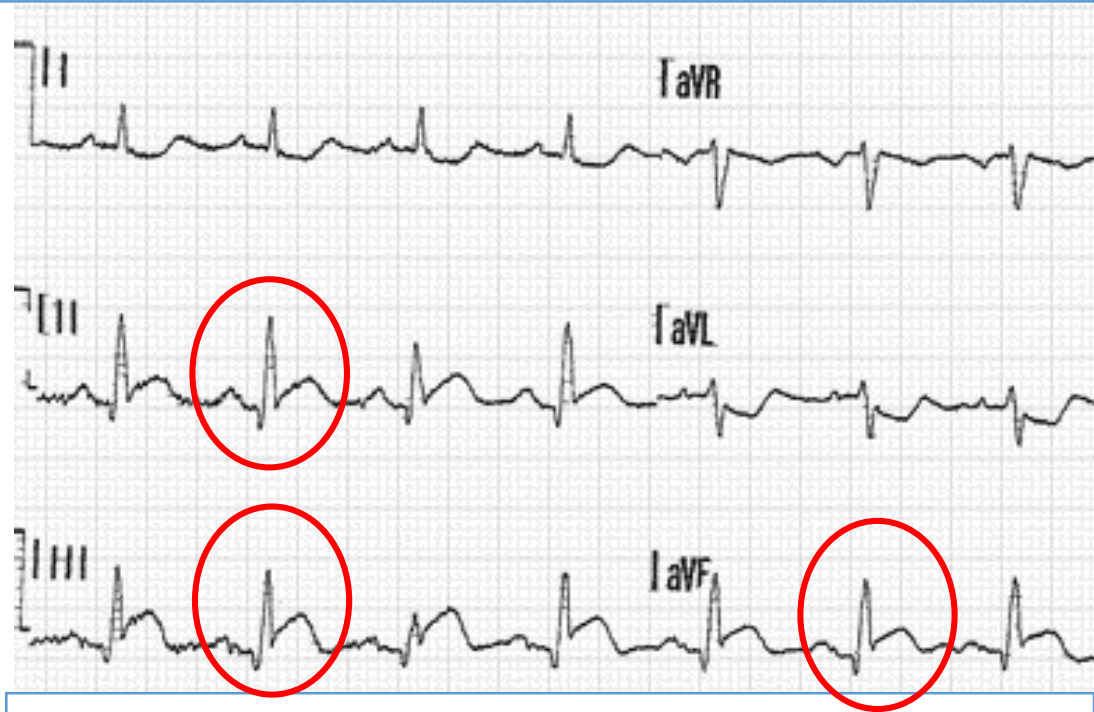
QRS Complex: Q Wave



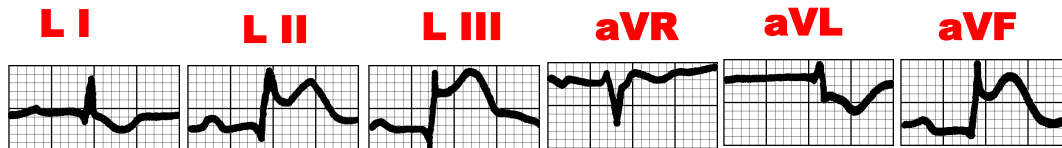
Inferior Wall Myocardial Infarction



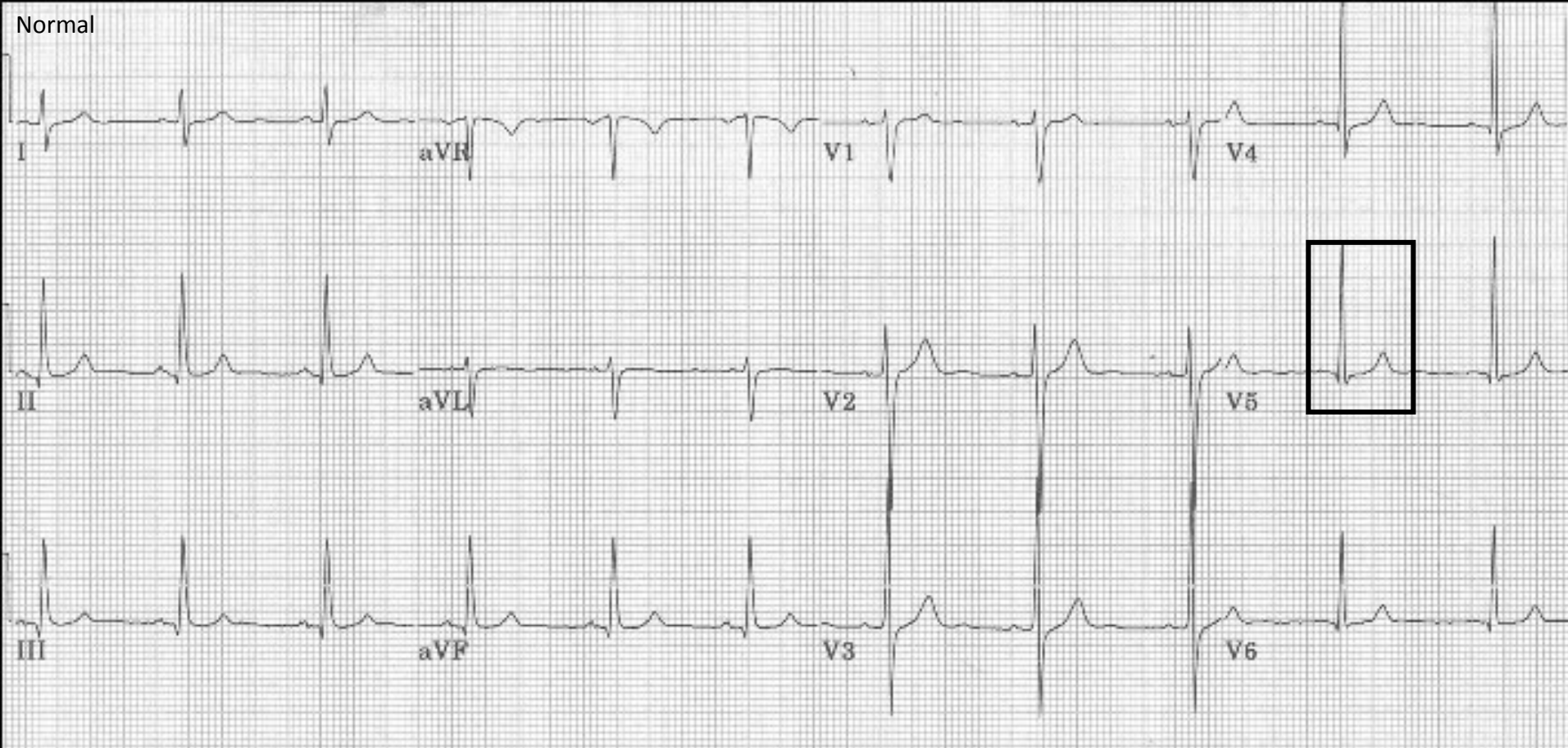
QRS Complex: Q Wave



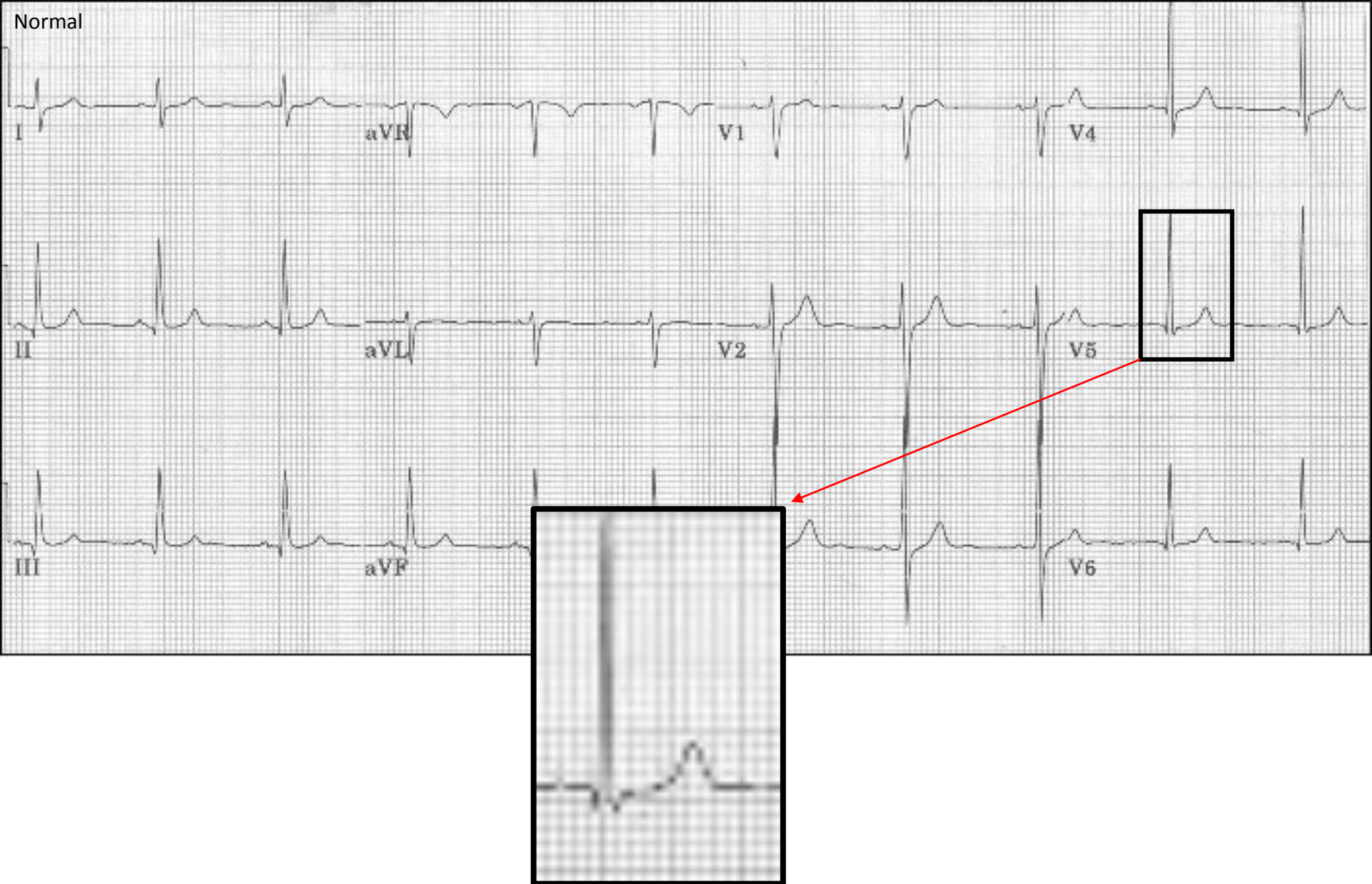
Inferior Wall Myocardial Infarction



Normal



Normal



ANT WALL MI



28 MAY 1994 1200

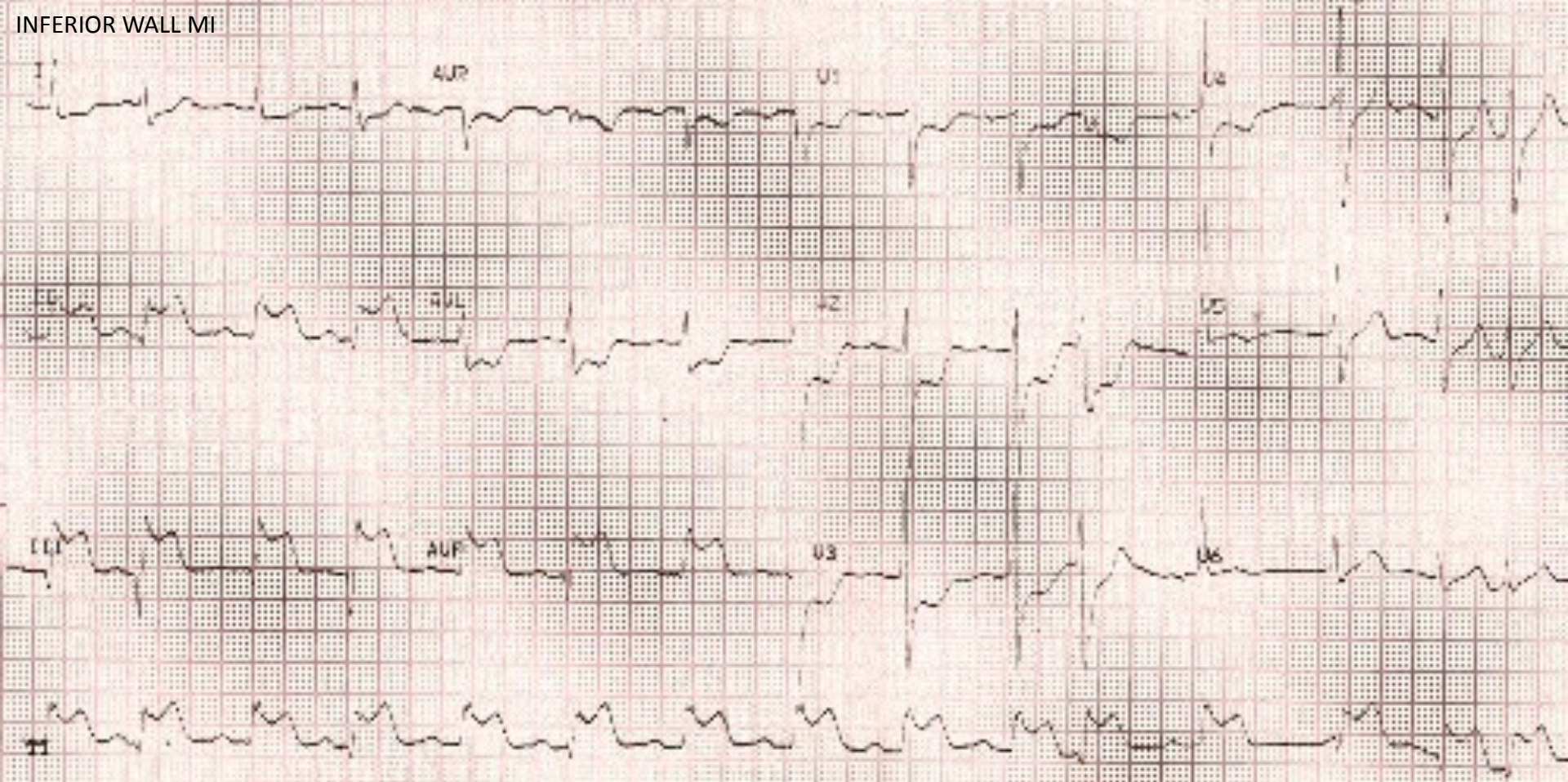
© 1997 Frank G. Yawowitz, M.D.

ANT WALL MI

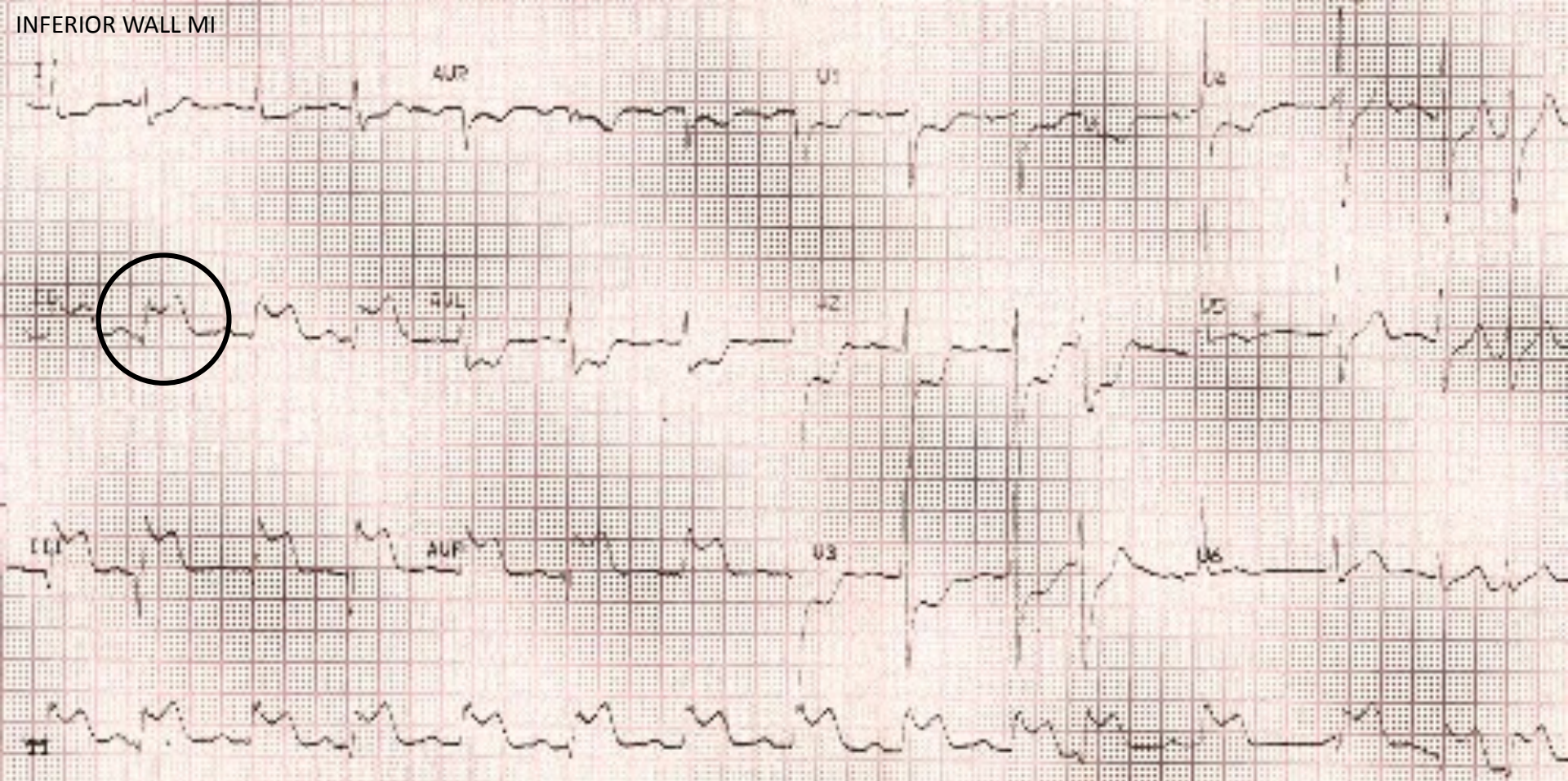
ANT WALL MI



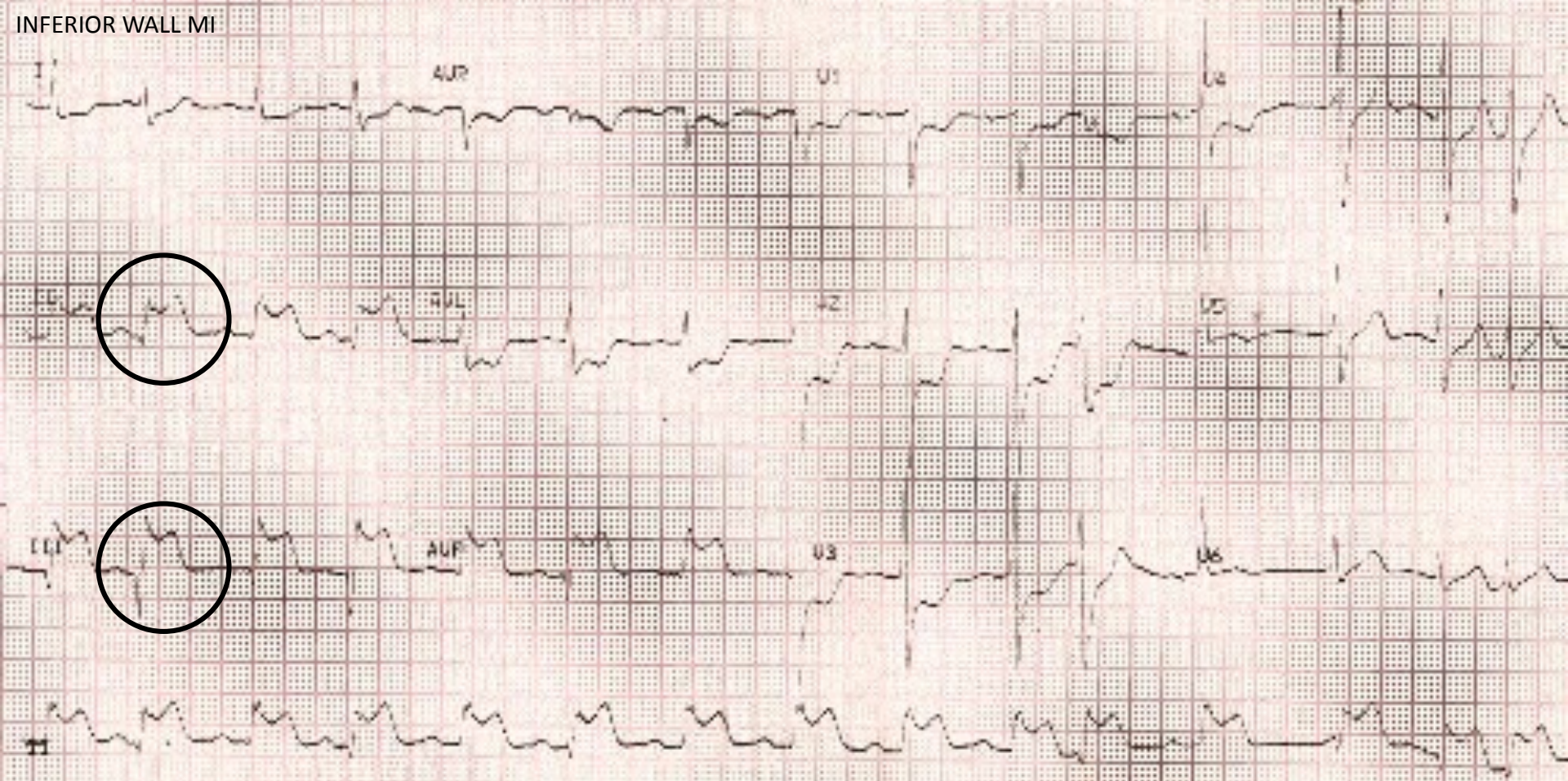
INFERIOR WALL MI



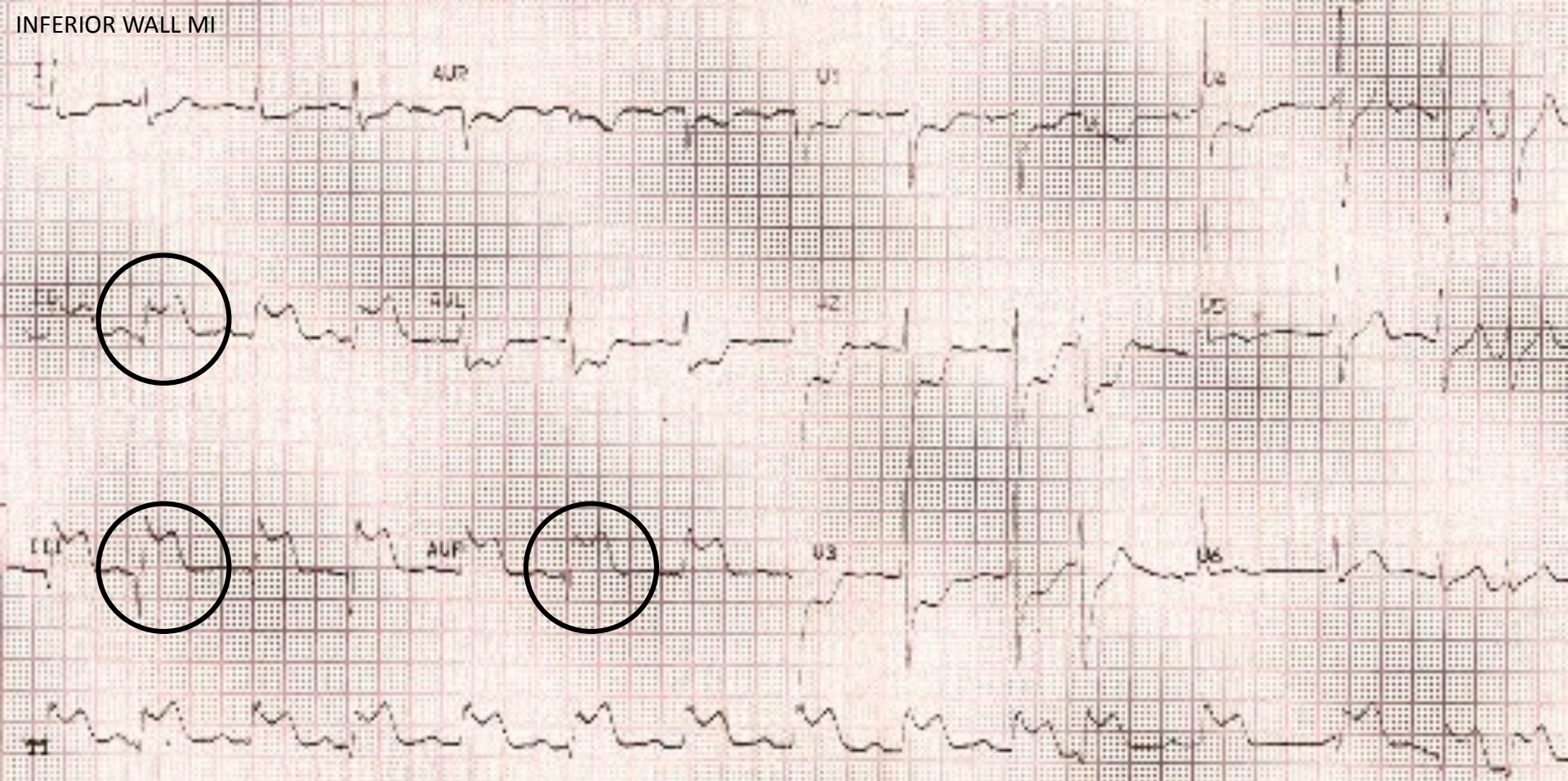
INFERIOR WALL MI



INFERIOR WALL MI



INFERIOR WALL MI

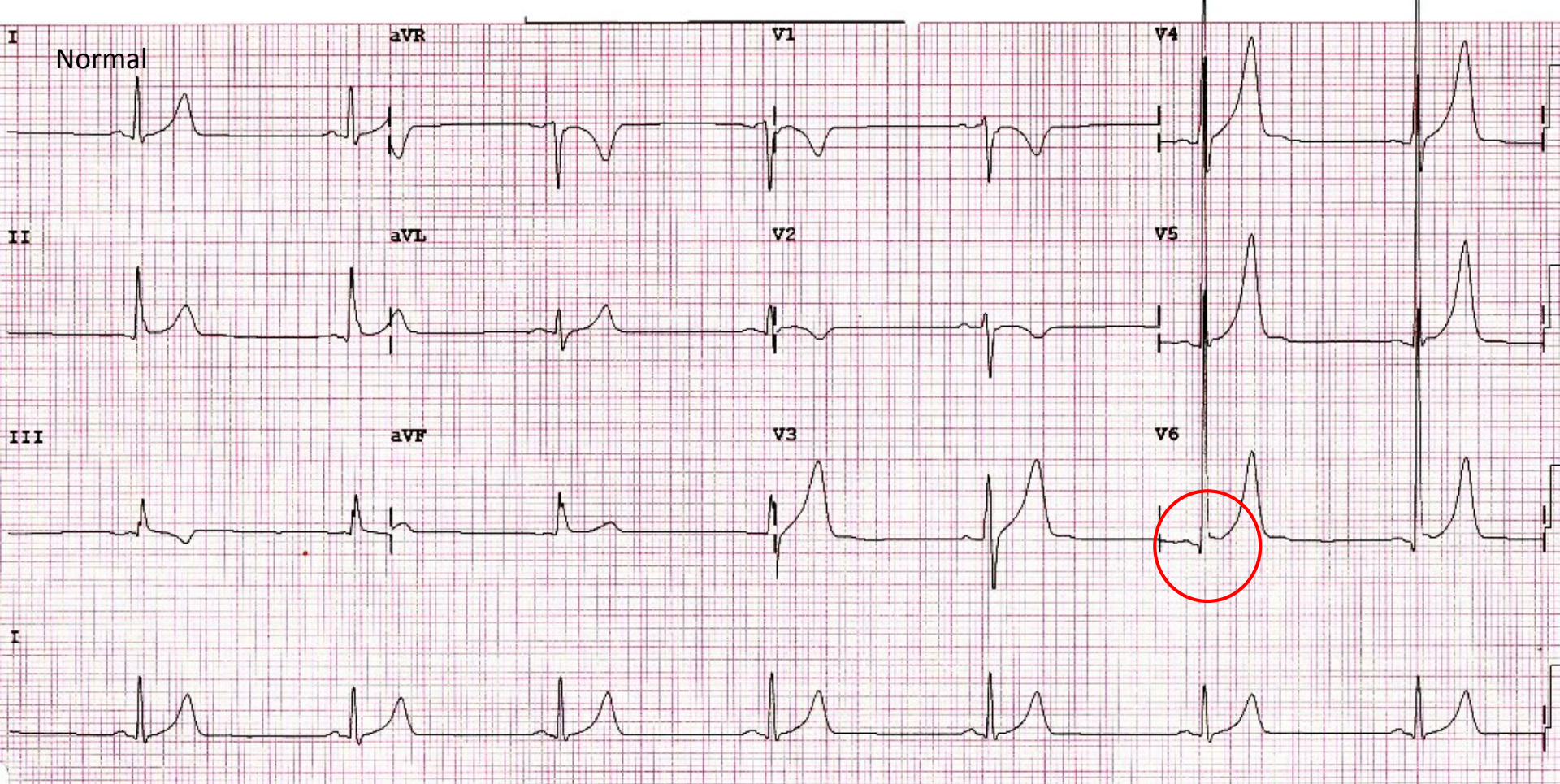


Test Yourself



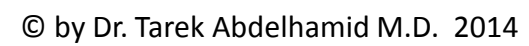
Comment on the Q wave











QRS - Duration

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

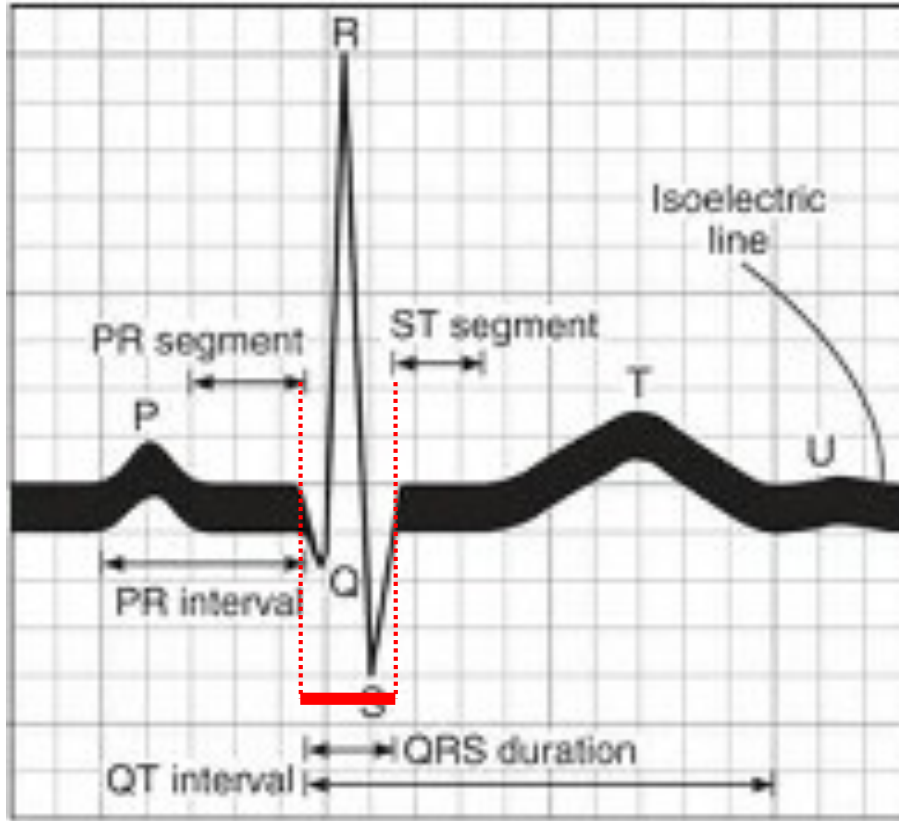
**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في هذا الموقع هم تحت حماية قانون الملكية الفكرية و لا يحق لأحد إستخدامه أو إستنساخه أو تحميله على أى كمبيوتر أو إعادة طبعه أو طبع أجزاء منه بدون إذن مسبق من الدكتور طارق عبد الحميد (أو من ينوب عنه قانونياً) . و من يتعدى على الملكية الفكرية المذكورة فسوف يتعرض للمسائلة القضائية عن جريمة إنتهاك حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص بـرجاء الإتصال بالدكتور طارق عبد الحميد



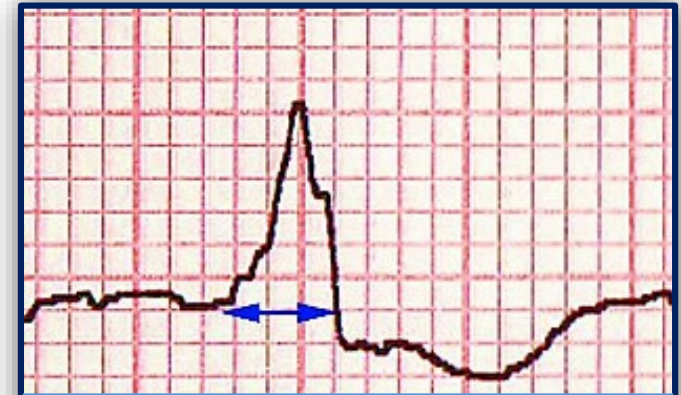
QRS Duration

Causes of Wide QRS Complex



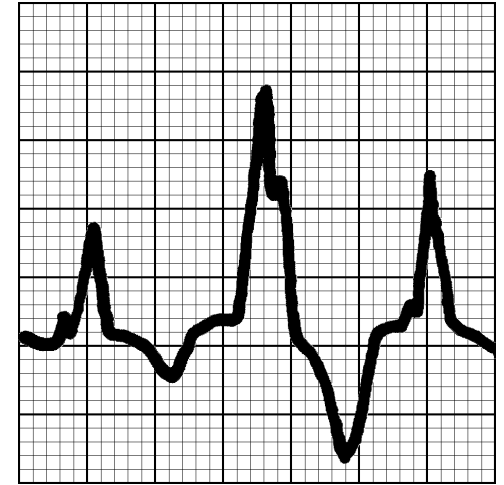
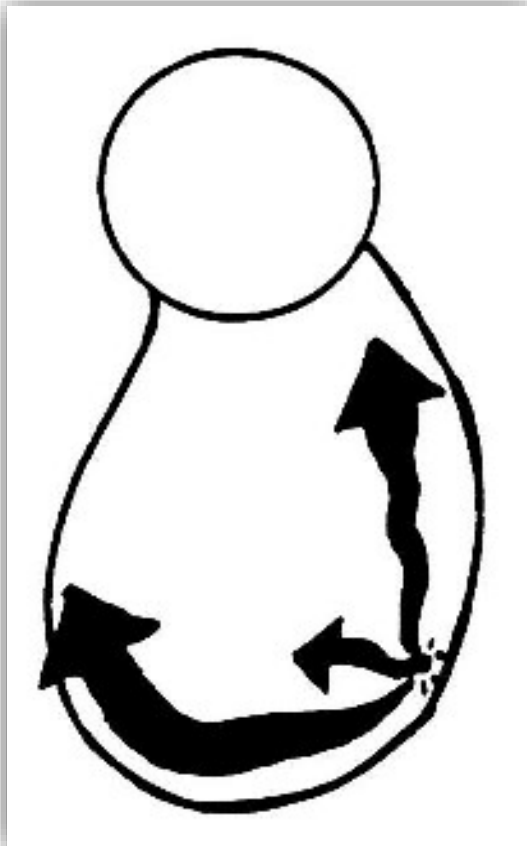
Normally: QRS Duration is less than 0.1sec

Less than 3 small squares



Wide QRS complex is more than 3 small squares

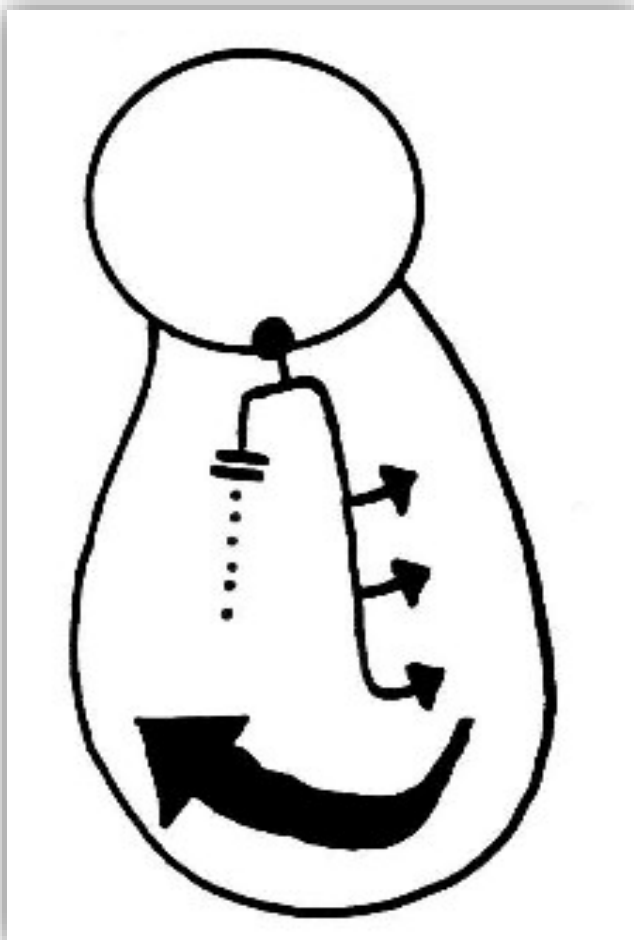
1 Ectopic focus in the ventricle



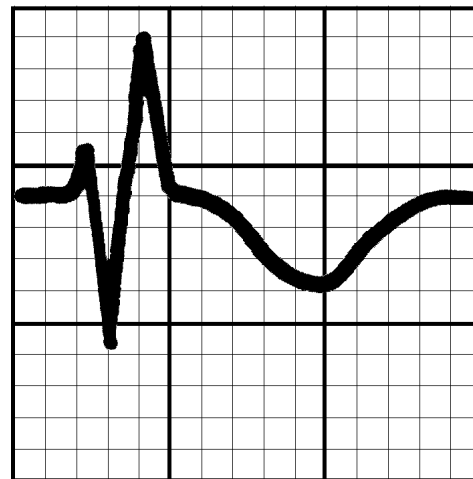
- ① Ventricular Premature Contractions (VPCs)
- ② Ventricular Tachycardia (VT)
- ③ Idioventricular Rhythm (IVR)

2

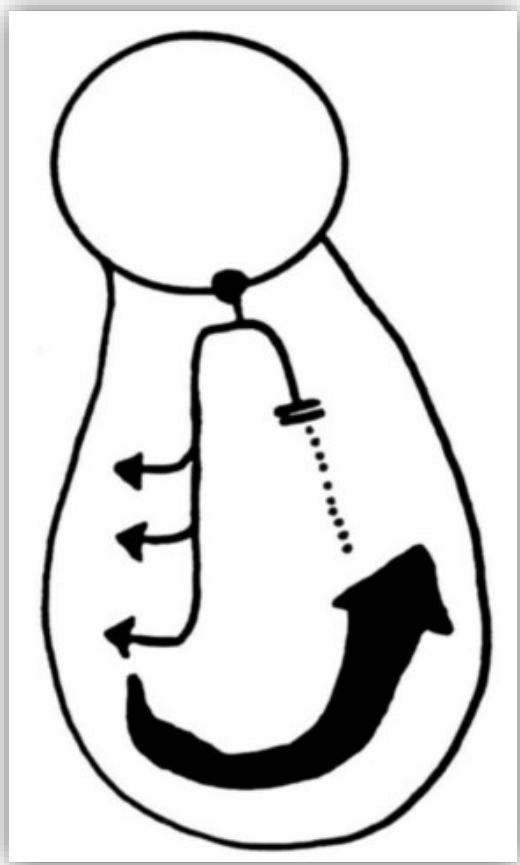
RBBB



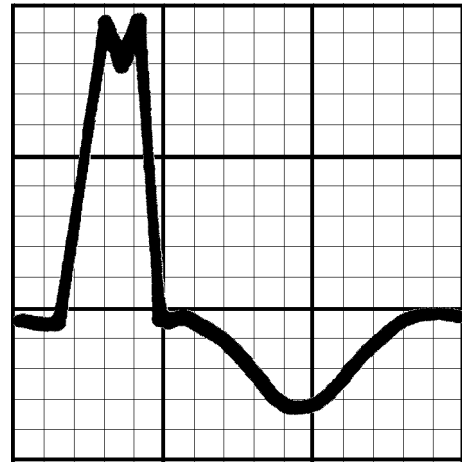
V1



3 LBBB

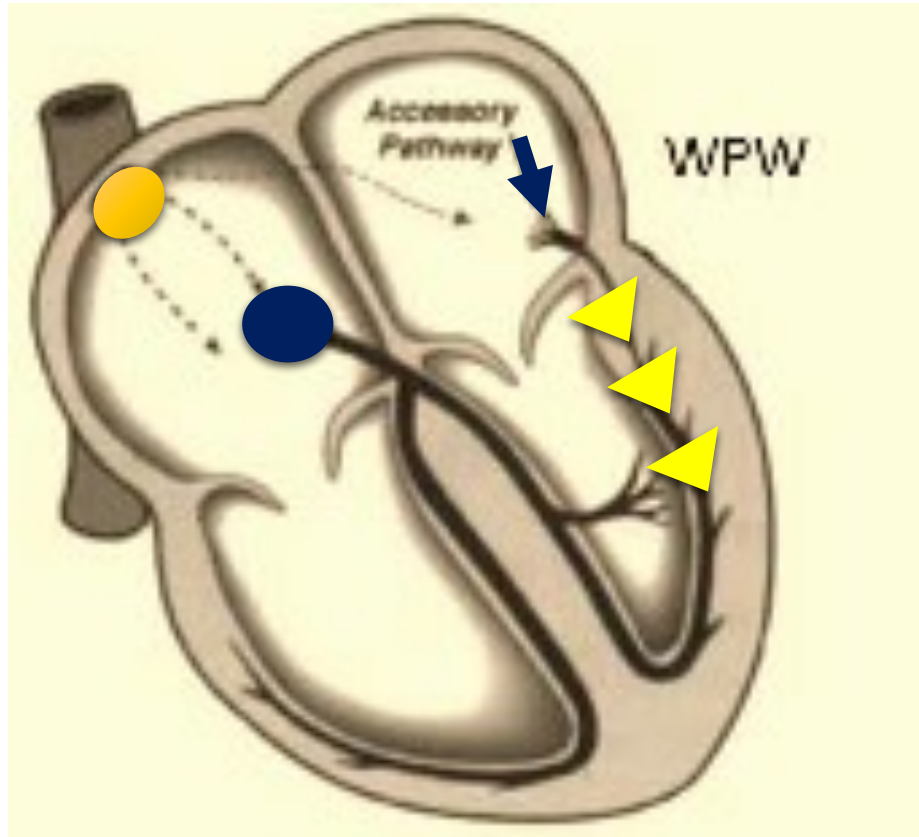


V6

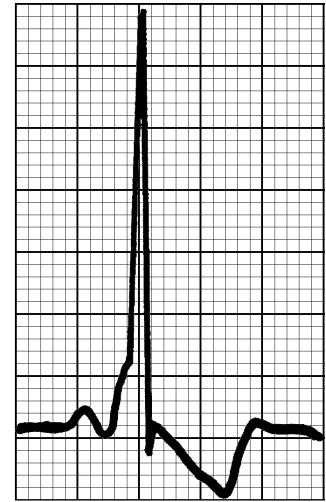


4

Wolff-Parkinson- White Syndrome

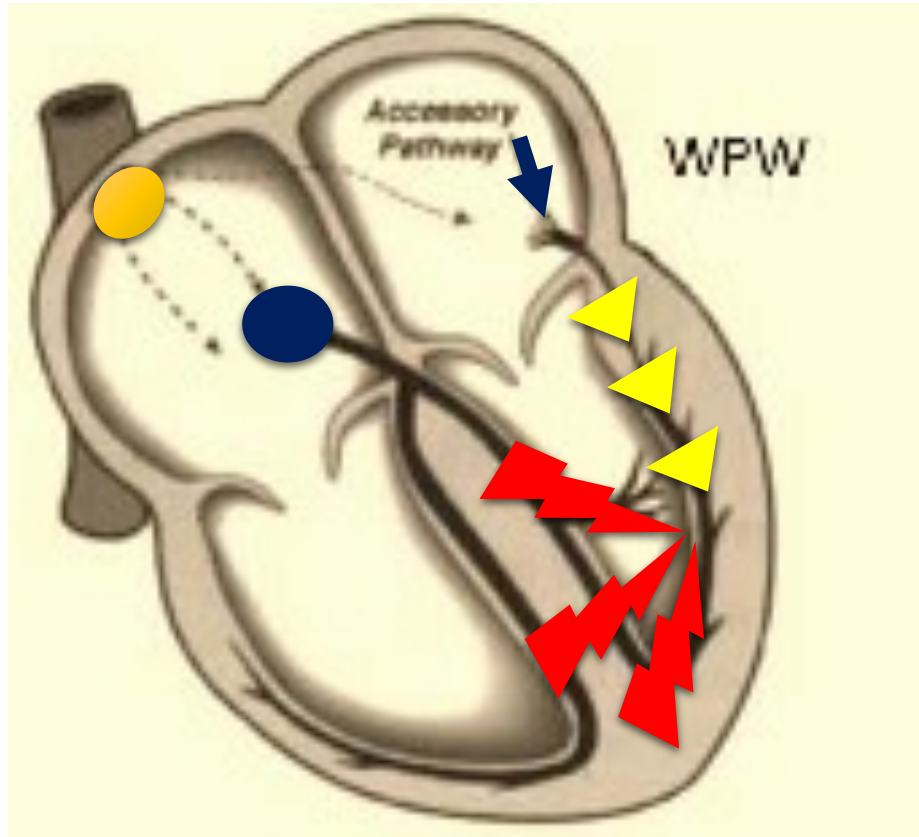


WPWS

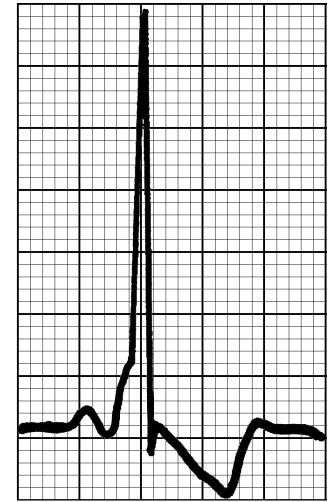


4

Wolff-Parkinson- White Syndrome



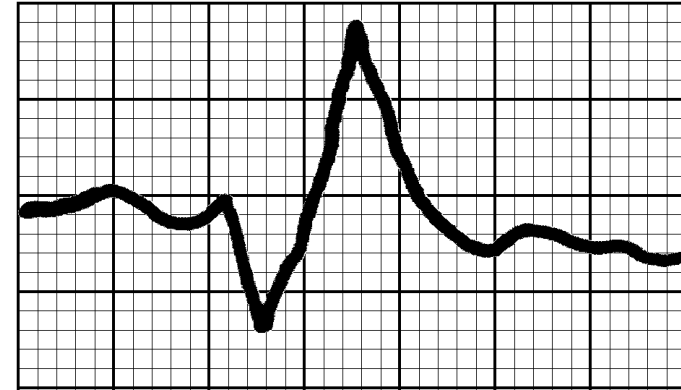
WPWS



4

Toxic conduction delay

- 1- Severe hyperkalemia**
- 2- Quinidine toxicity**
- 3- TCAD toxicity**
- 4- Phenothiazine toxicity**

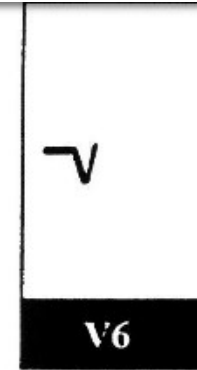
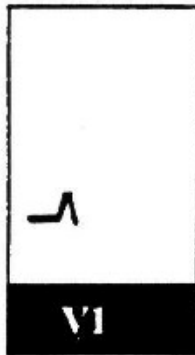
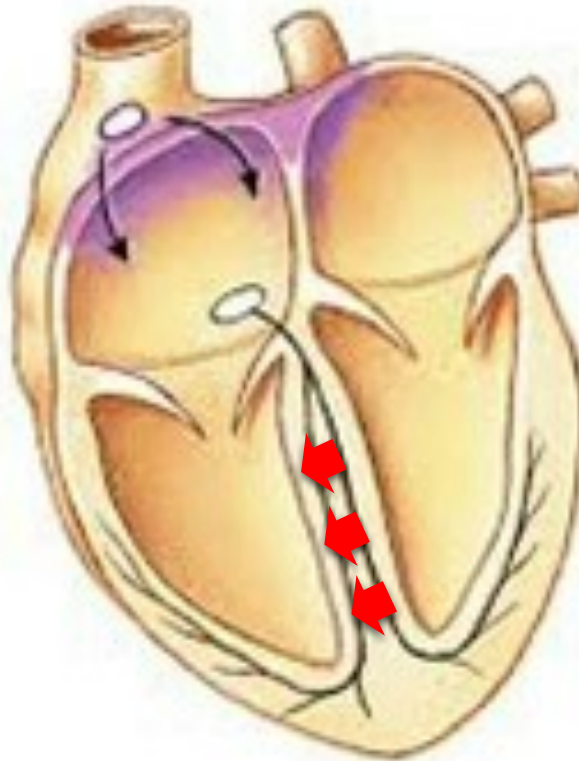




**Let us now learn more
about Bundle Branch
Block**

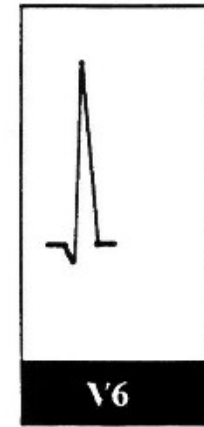
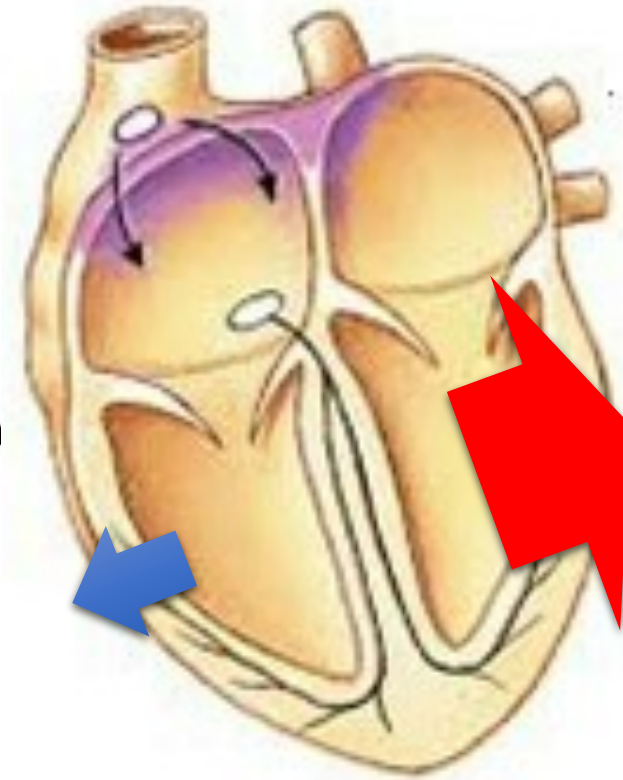
Normal activation of the heart

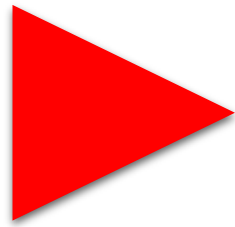
Stage 1



Initial septal q in V6
is a normal
finding!!!!

Stage 2





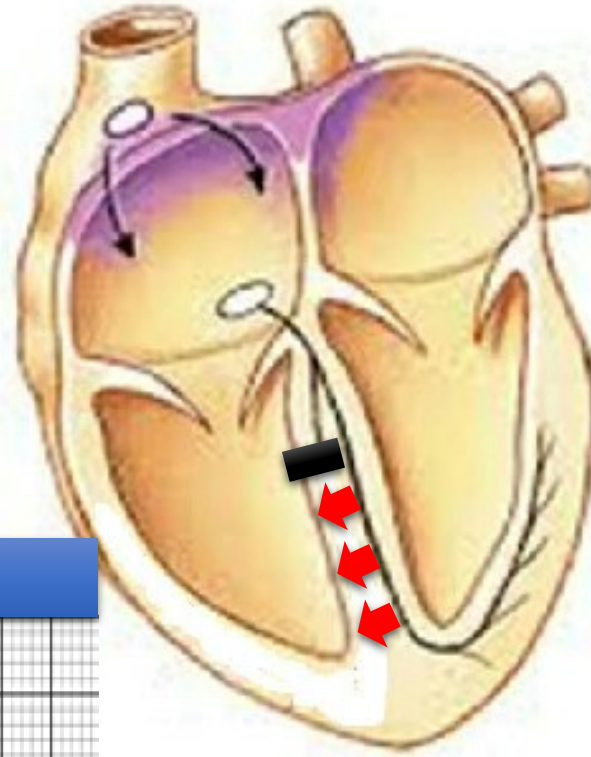
RBBB

Causes:

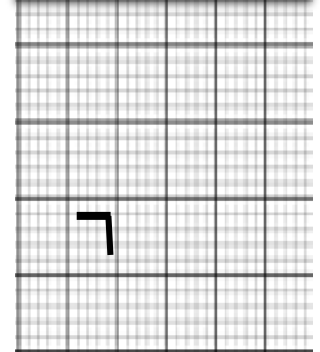
- ① **Idiopathic**
- ② **AMI**
- ③ **Cardiomyopathy**
- ④ **Pulmonary embolism**
- ⑤ **Fibrosis**



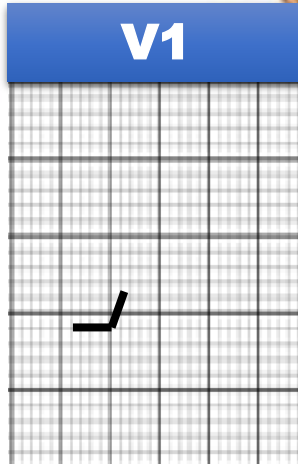
RBBB

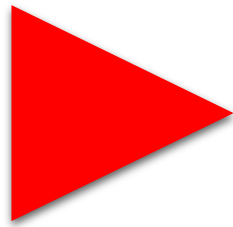


V6

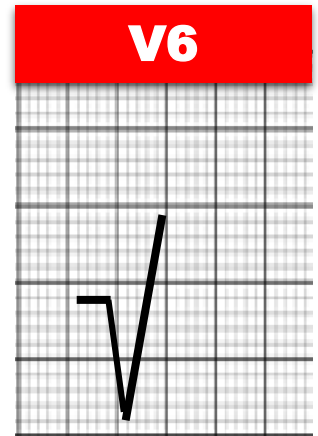
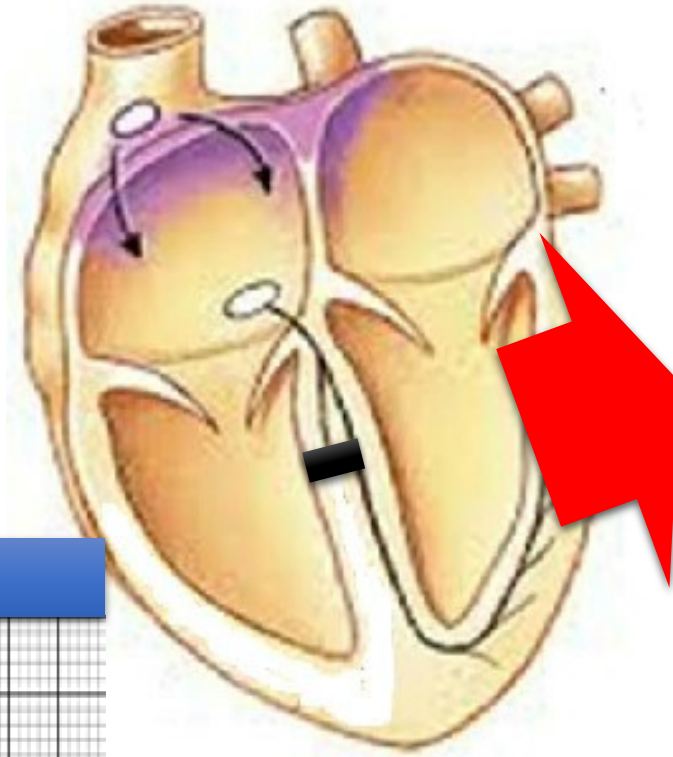


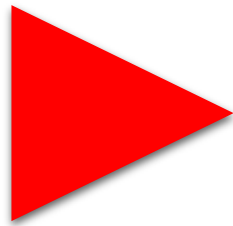
V1





RBBB



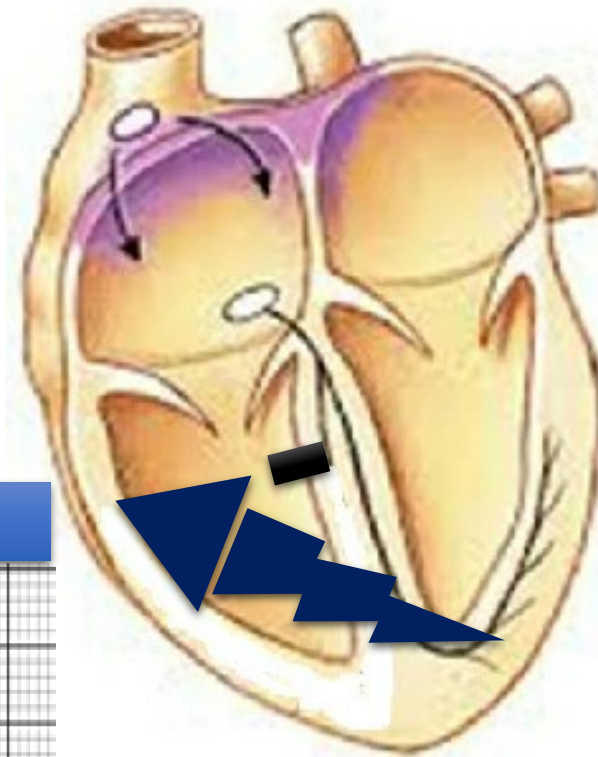


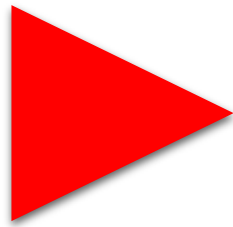
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V6



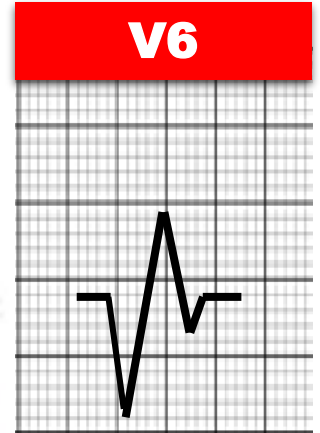
V1





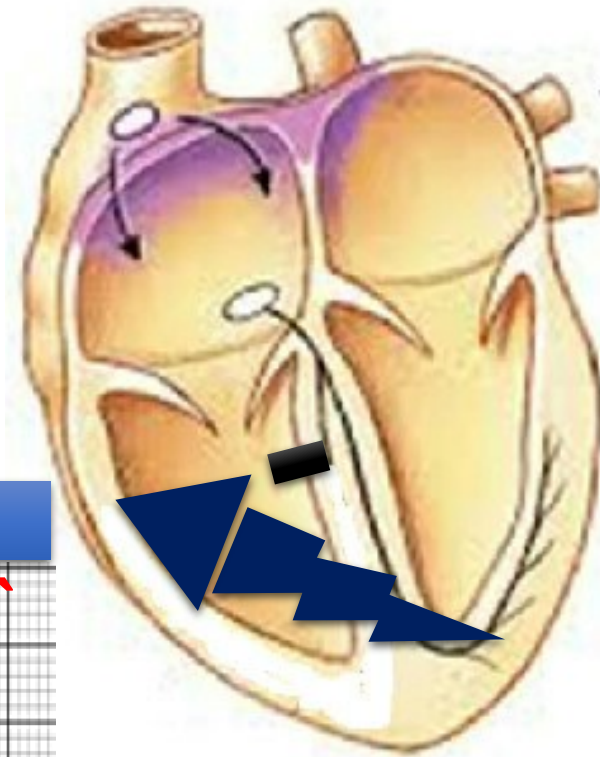
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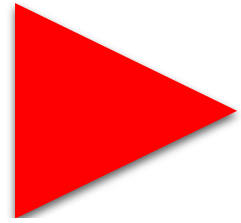
V6



V1

RSR'



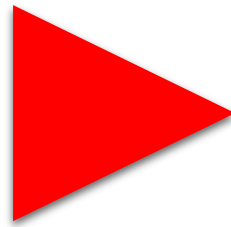


LBBB

Causes:

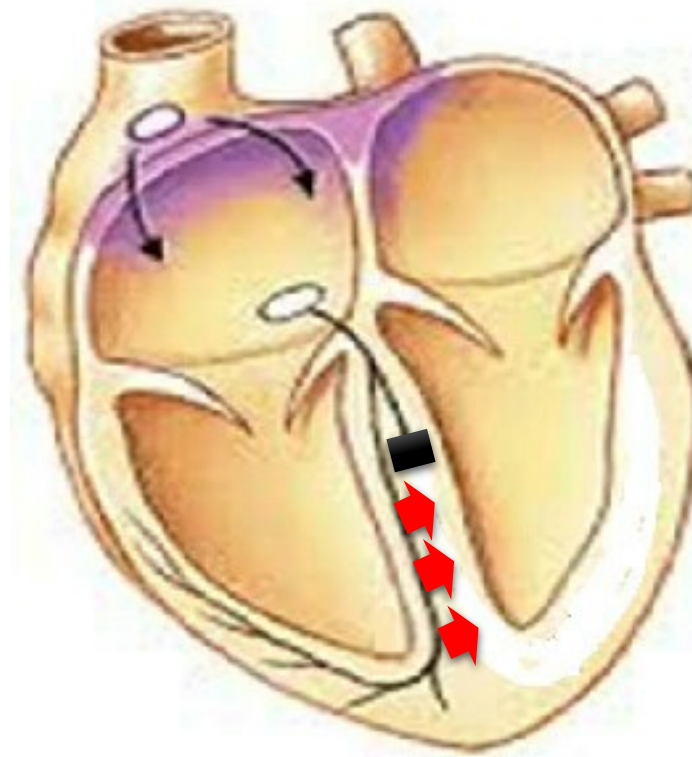
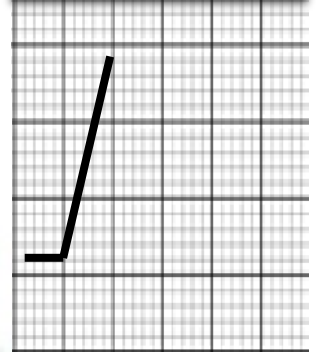
- ① AMI**
- ② Fibrosis**
- ③ Cardiomyopathy**
- ④ Hypertension**
- ⑤ Congestive heart failure**





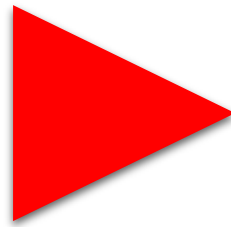
LBBB

V6



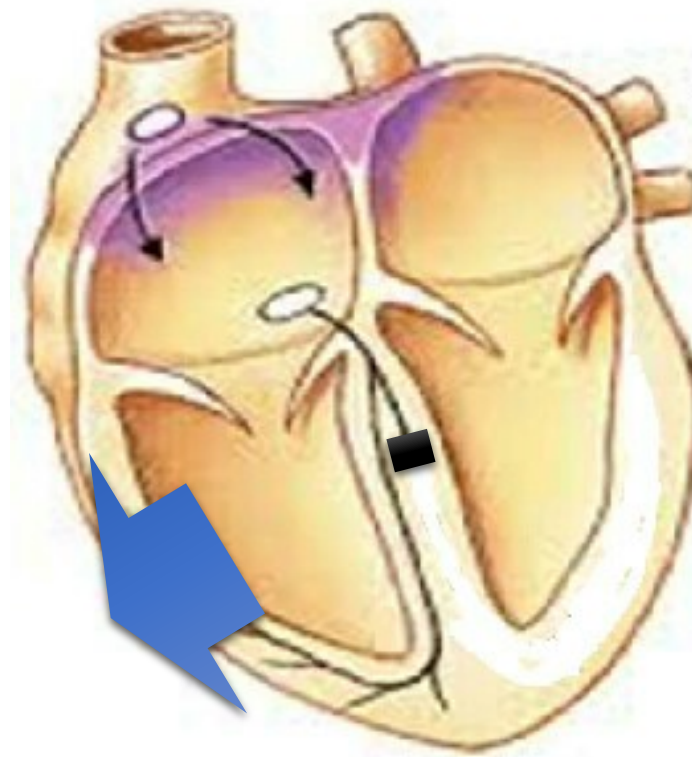
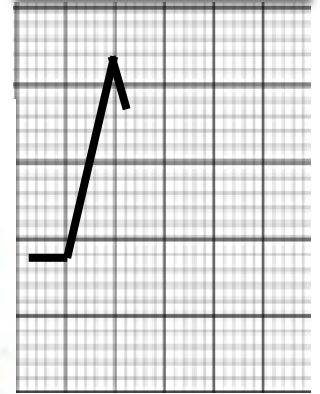
V1





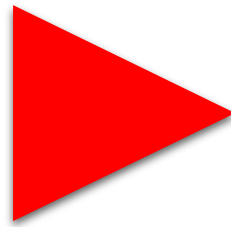
LBBB

V6

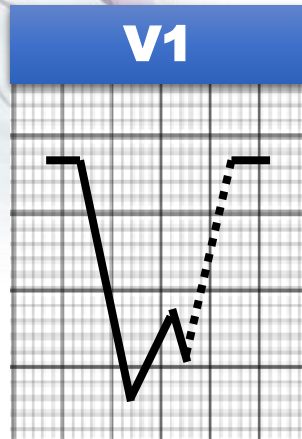
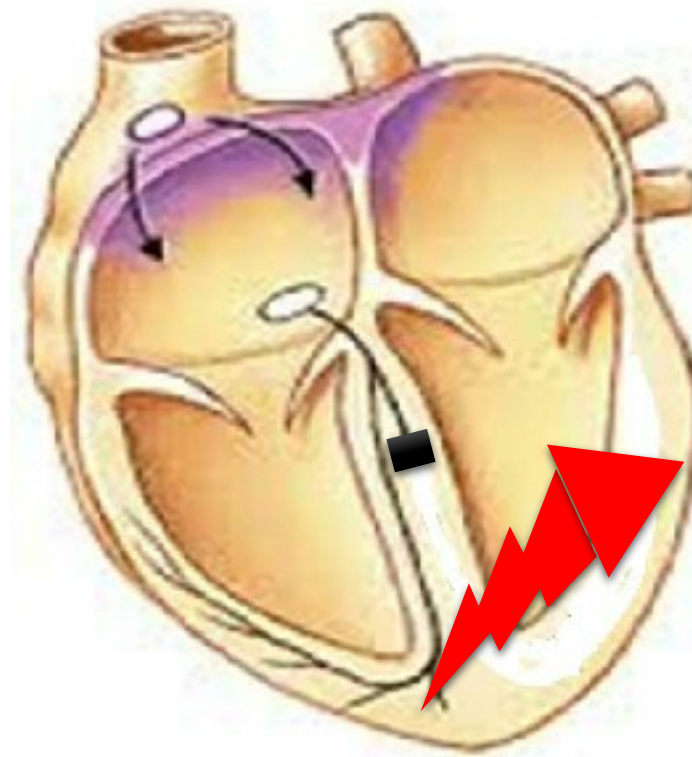
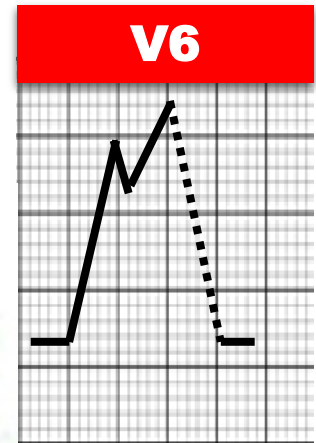


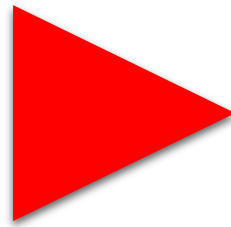
V1





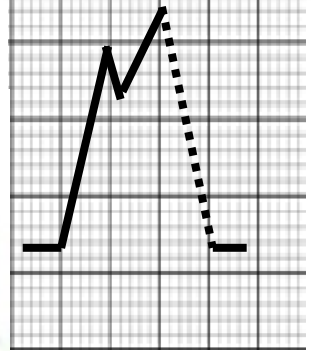
LBBB



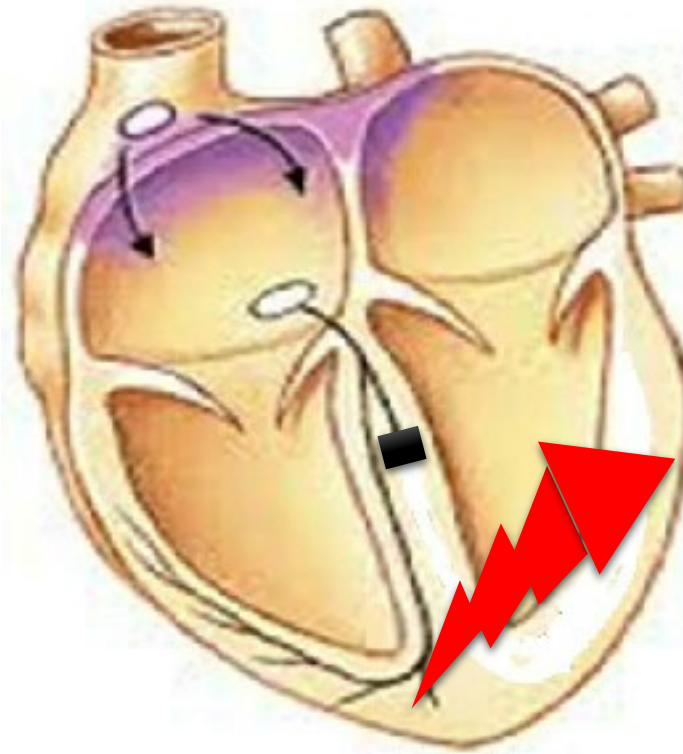


LBBB

V6

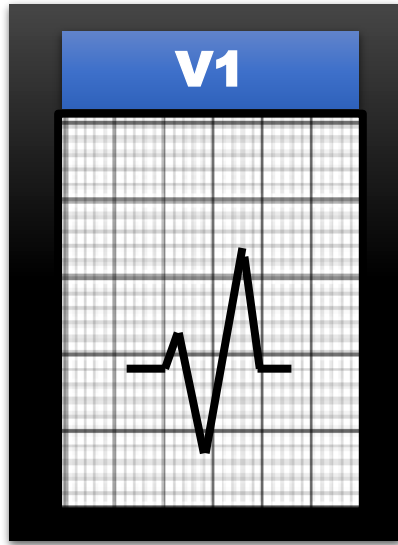


M shape pattern



V1





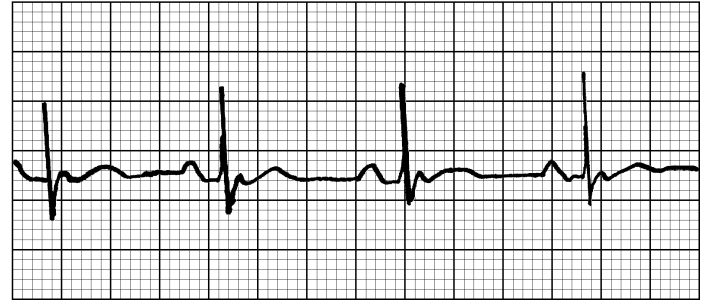
In RBBB the ECG will show RSR' pattern in V1.

In LBBB the ECG will show M shape pattern in V6.

**Let us revise
the QRS
Duration**



QRS Complex: Duration



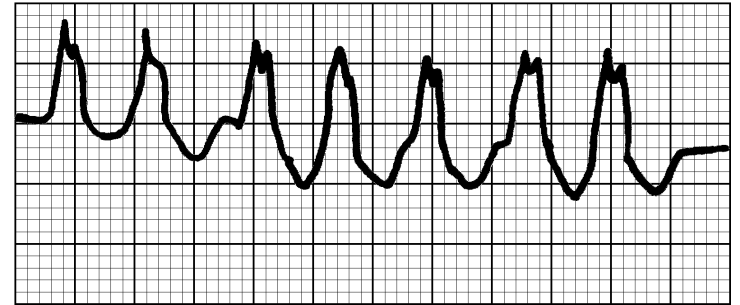
Normal ECG

QRS Complex: Duration



Normal QRS in SVT

QRS Complex: Duration

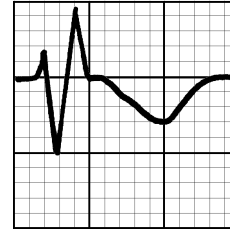


**Wide Bizarre
QRS in VT**

QRS Complex: Duration

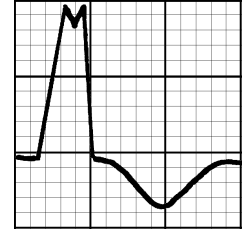


V1



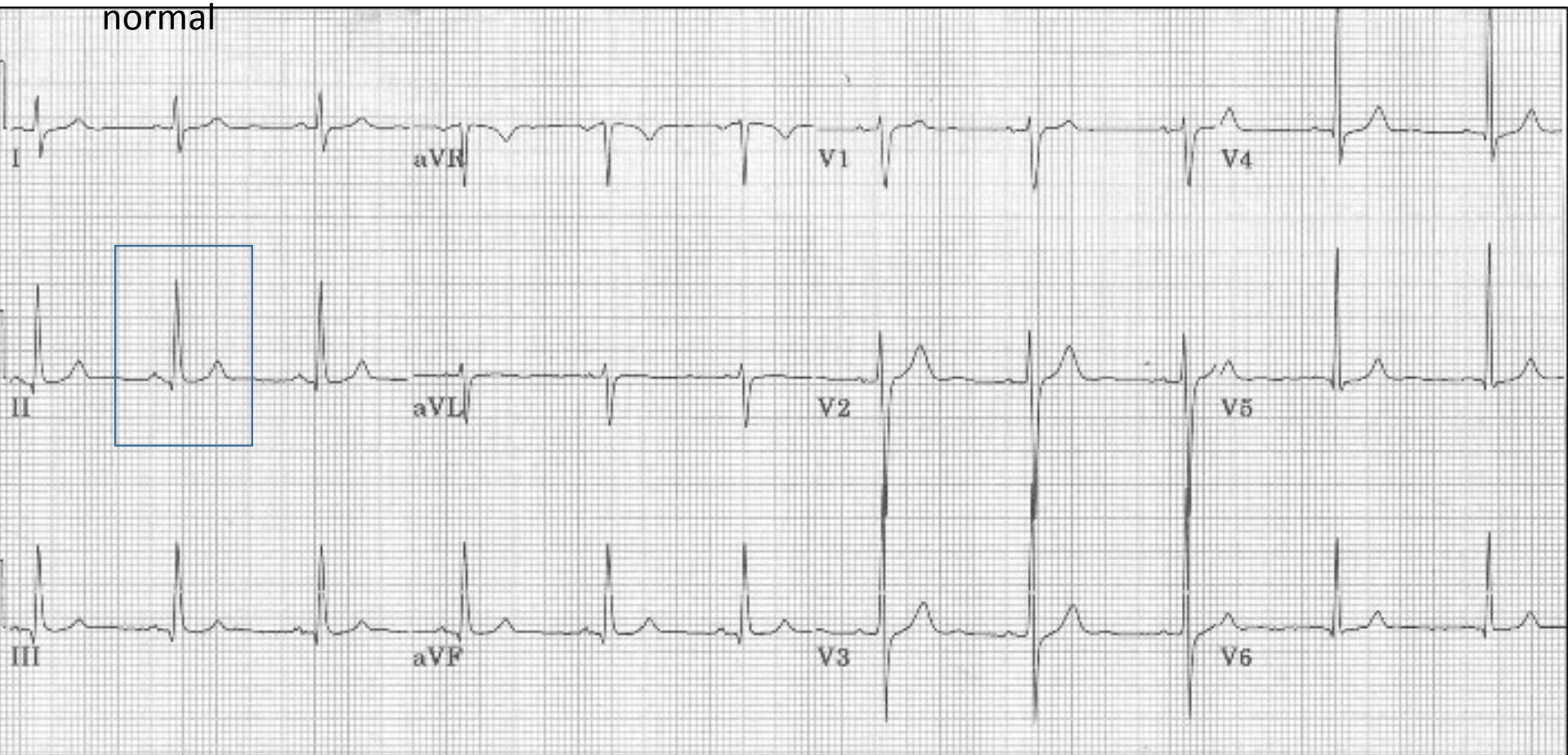
RBBB

V6

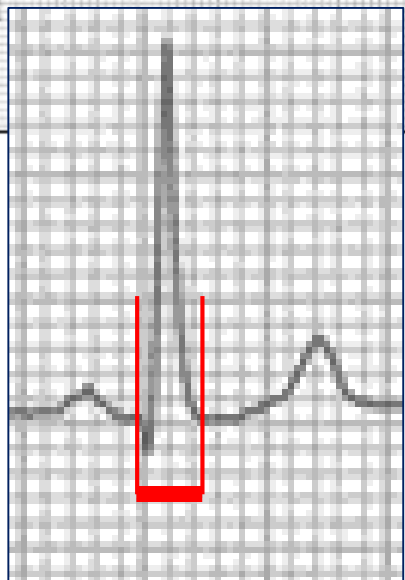
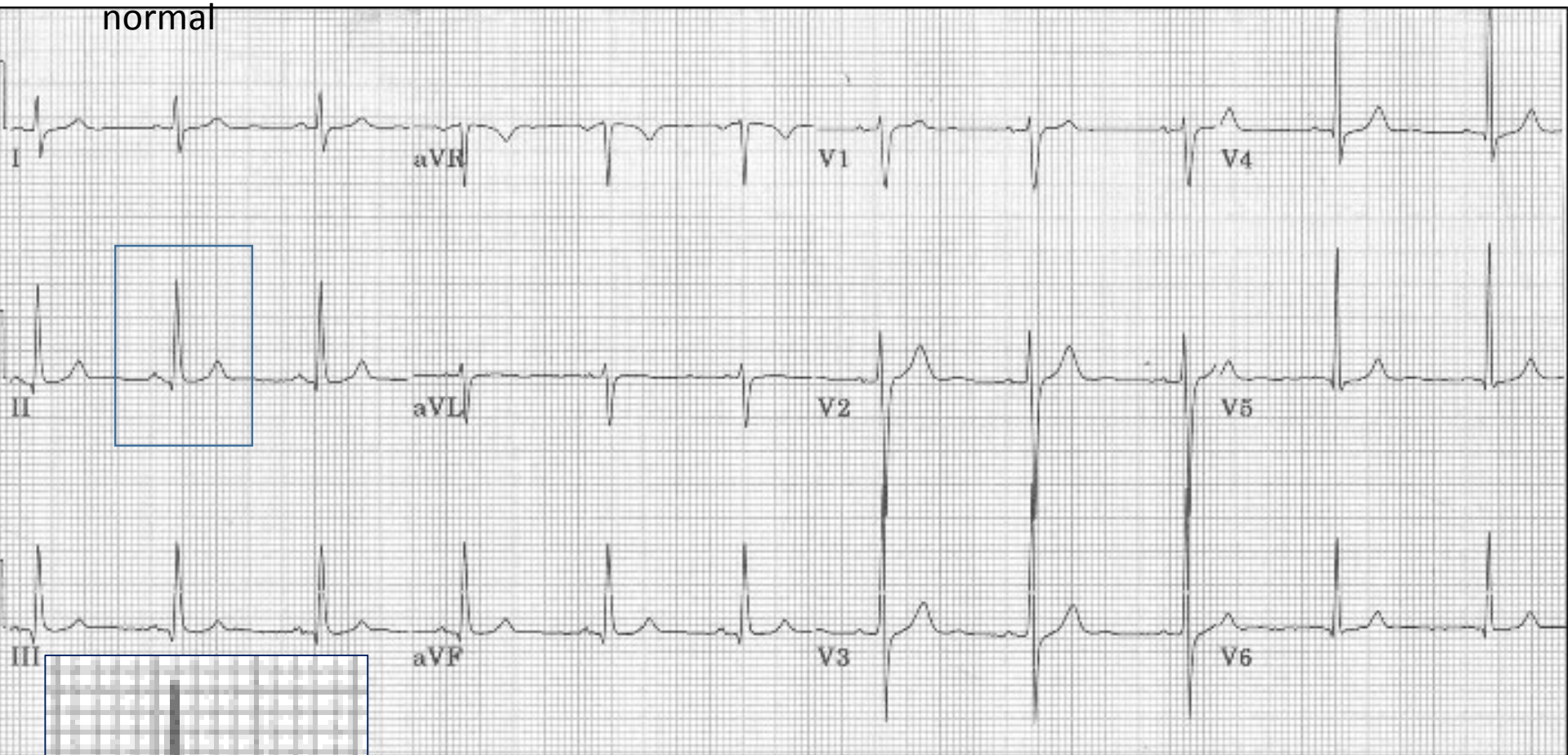


LBBB

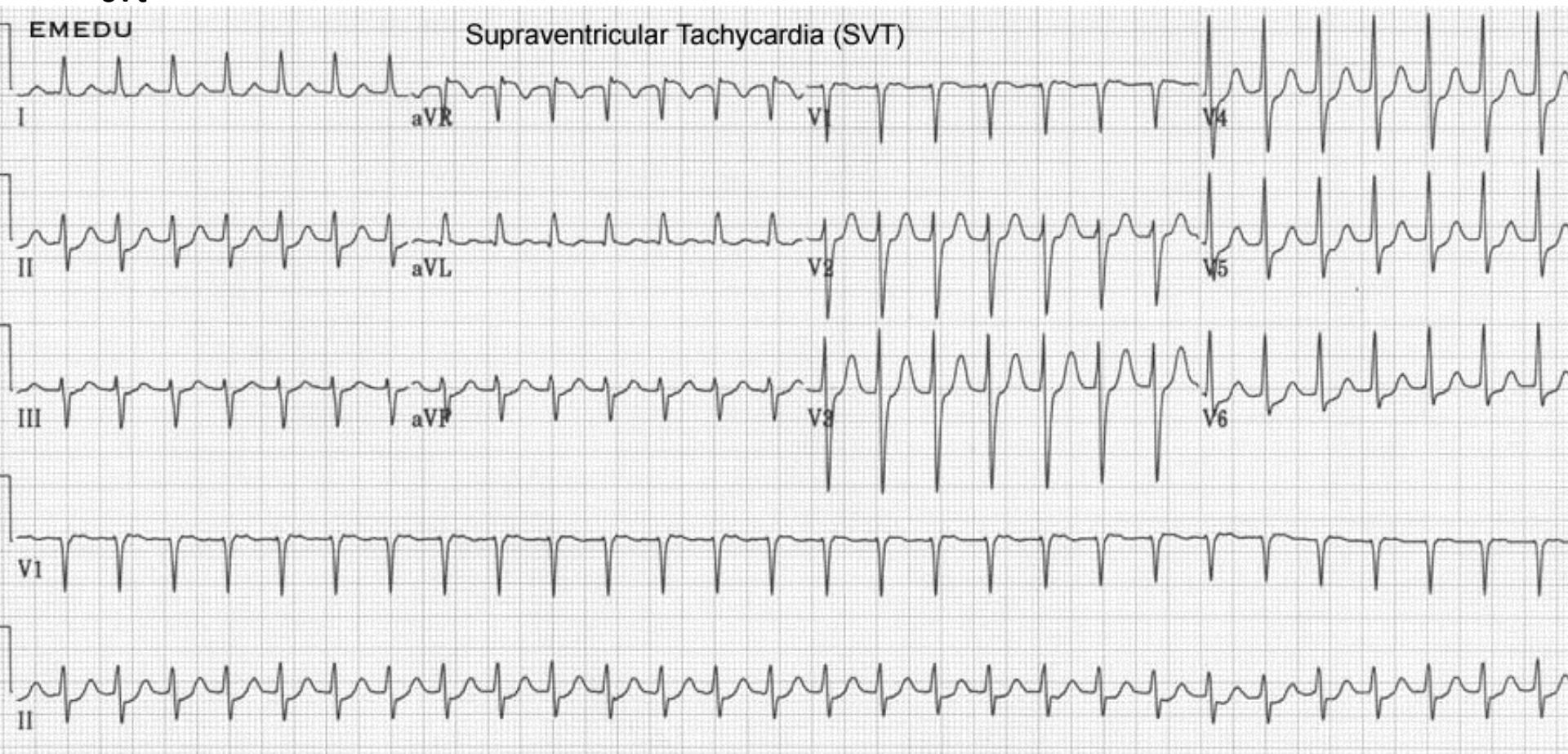
normal



normal



svt



ATTENDING 002669

VT

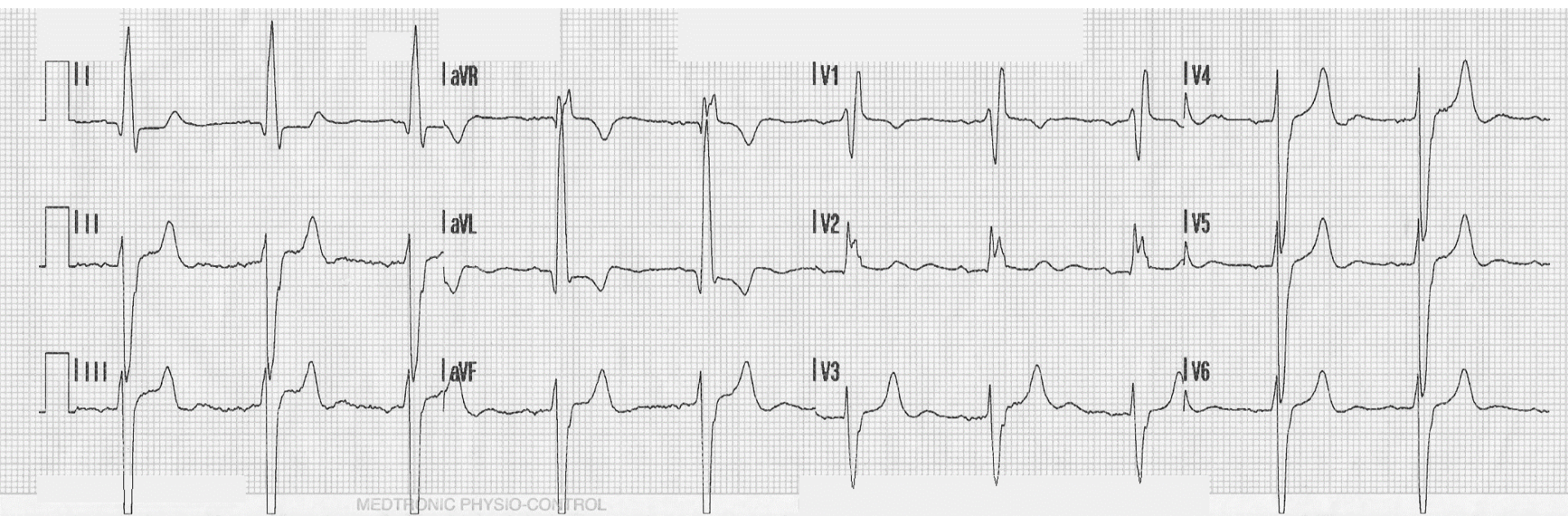
PRIORITY 3

RDS ACCT

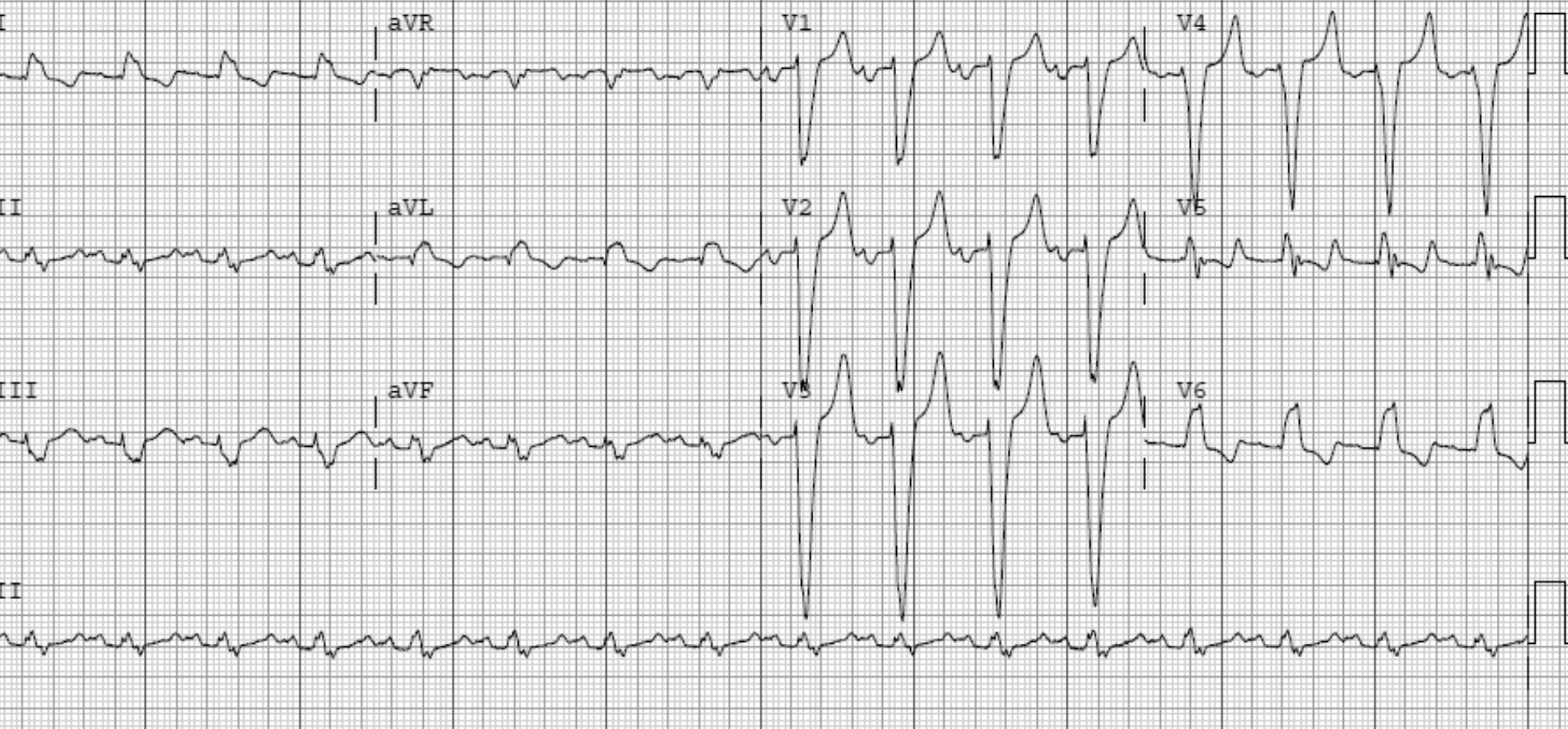
VISIT NO 0369



RBBB



LBBB

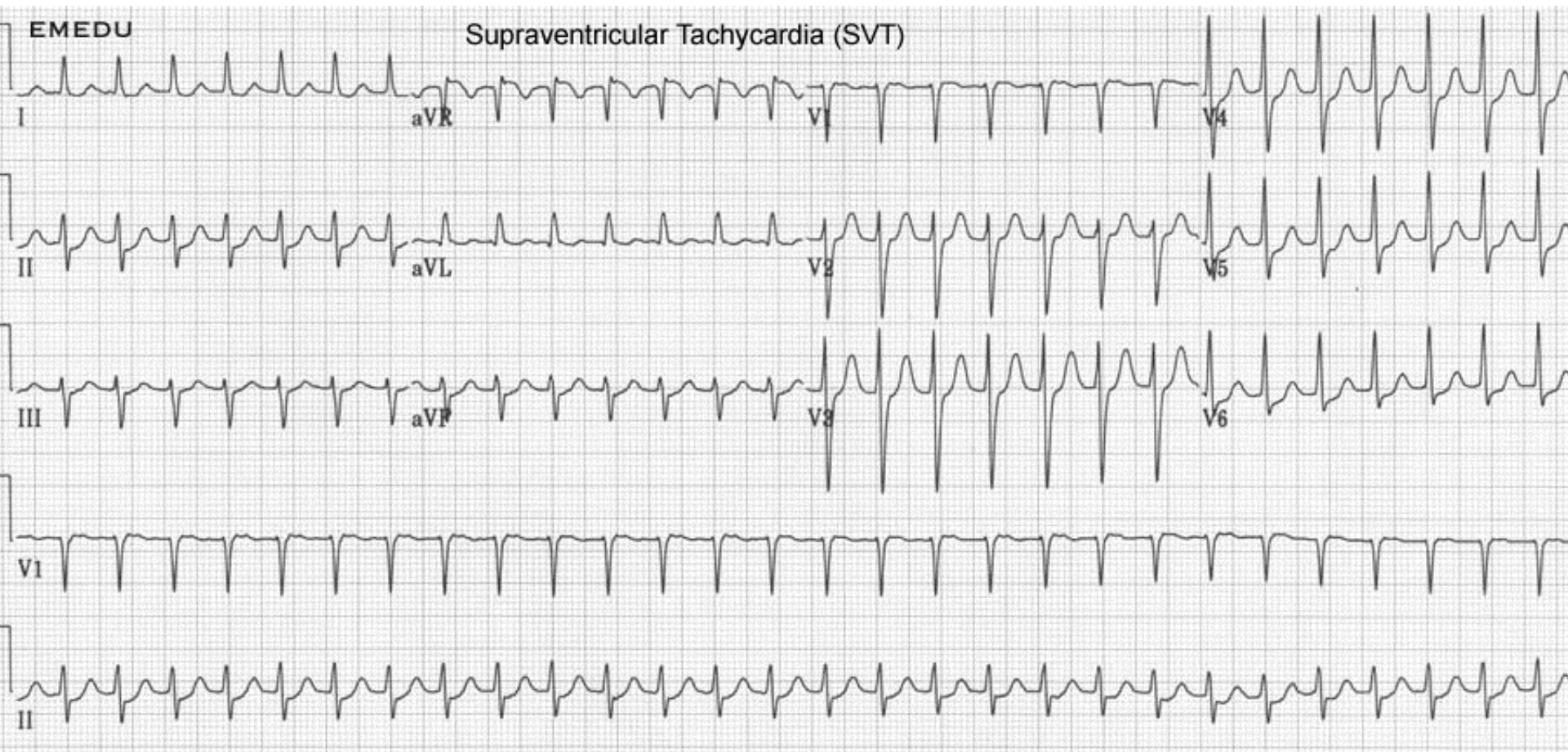


Test Yourself



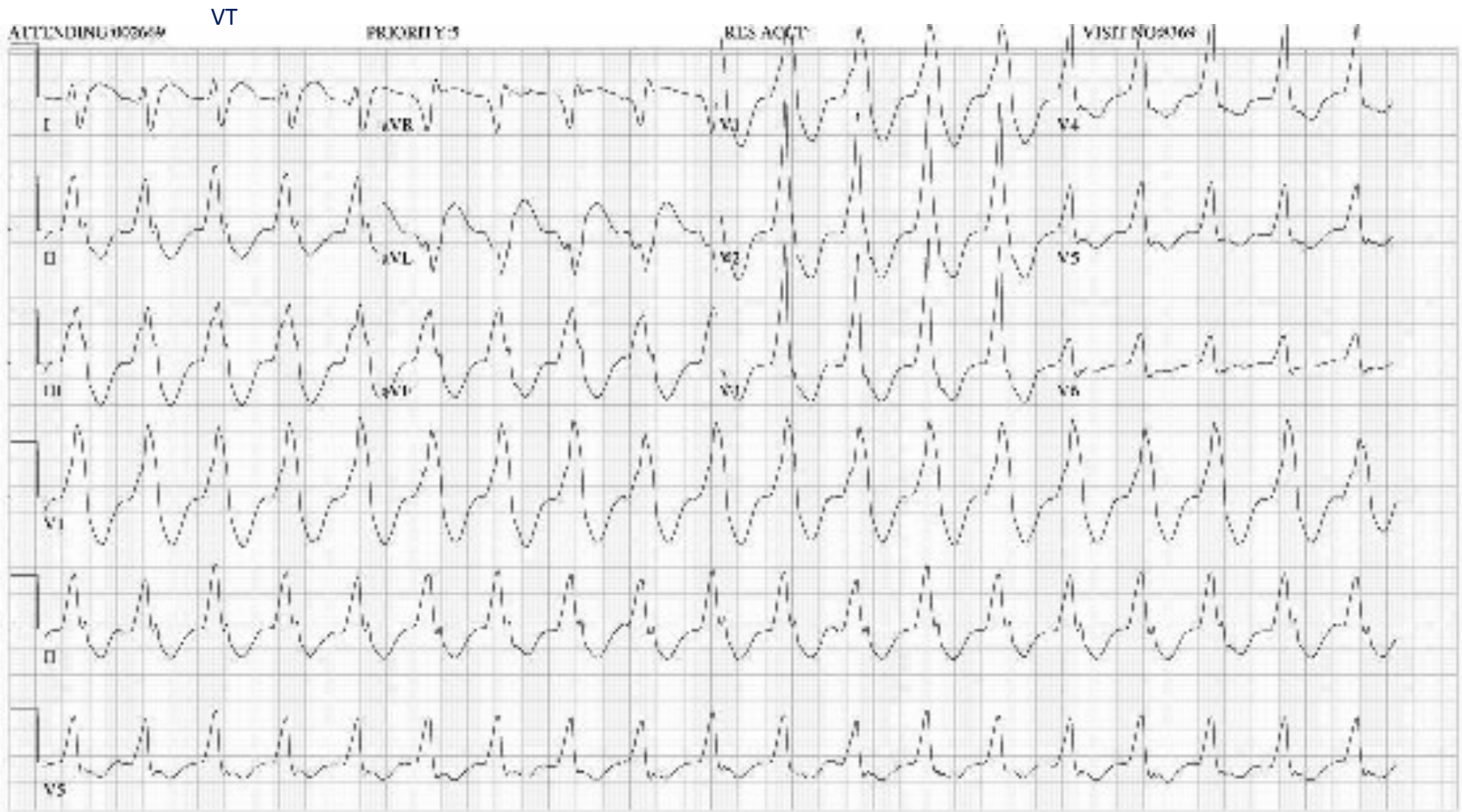
Comment on the QRS Complex





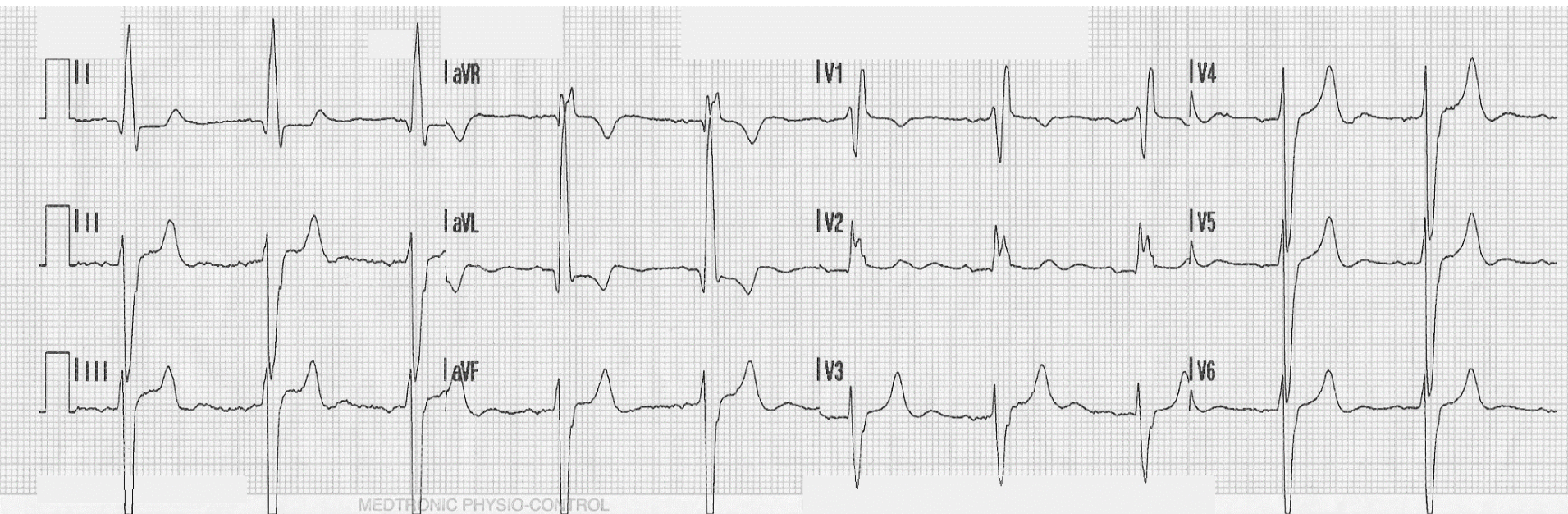
① Normal QRS duration

② Wide bizarre QRS duration



① Normal QRS duration

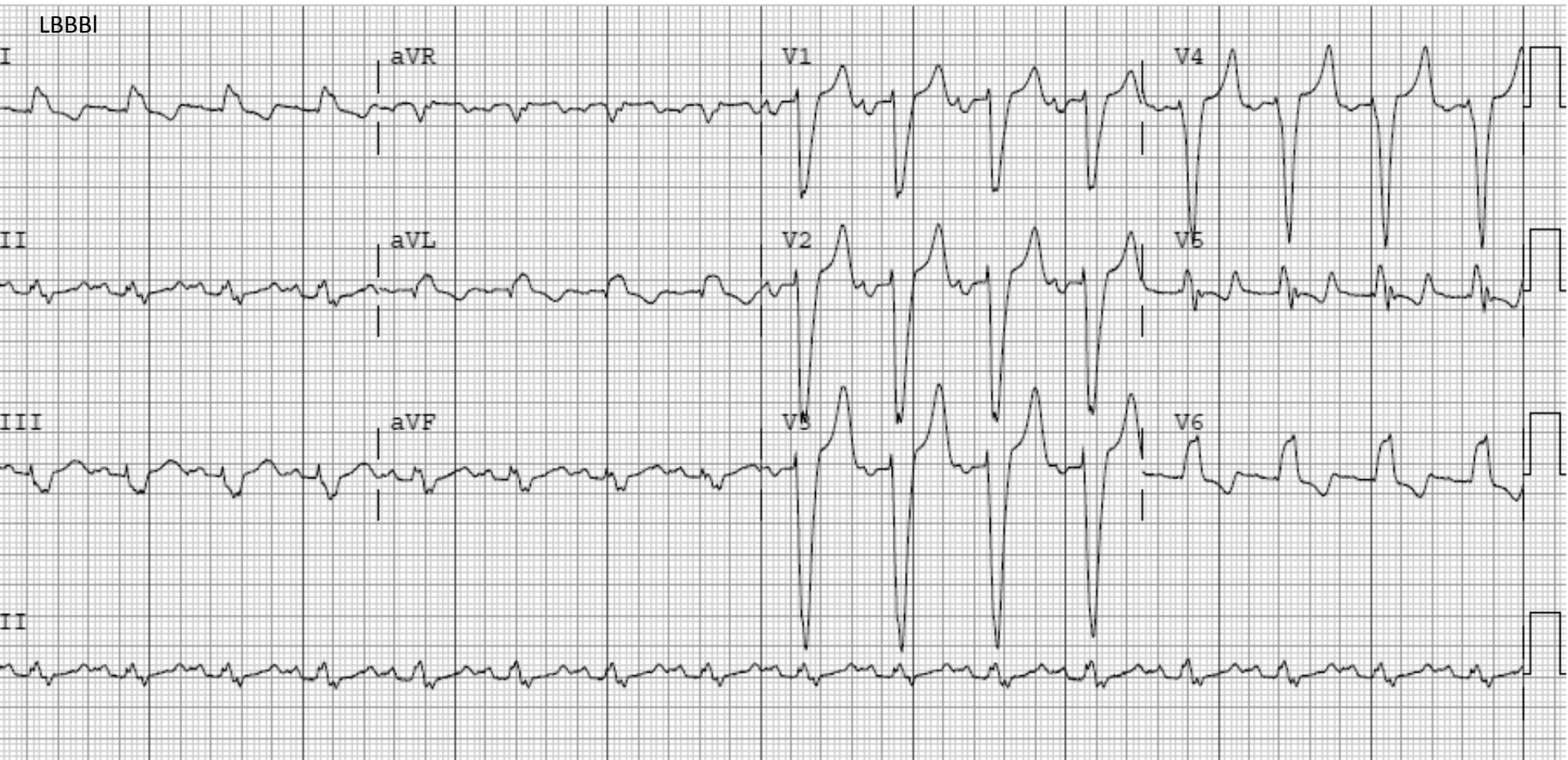
② Wide bizarre QRS duration



1 Normal QRS pattern

2 RBBB pattern

3 LBBB pattern



1 Normal QRS pattern

2 RBBB pattern

3 LBBB pattern

QRS - Voltage Amplitude

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

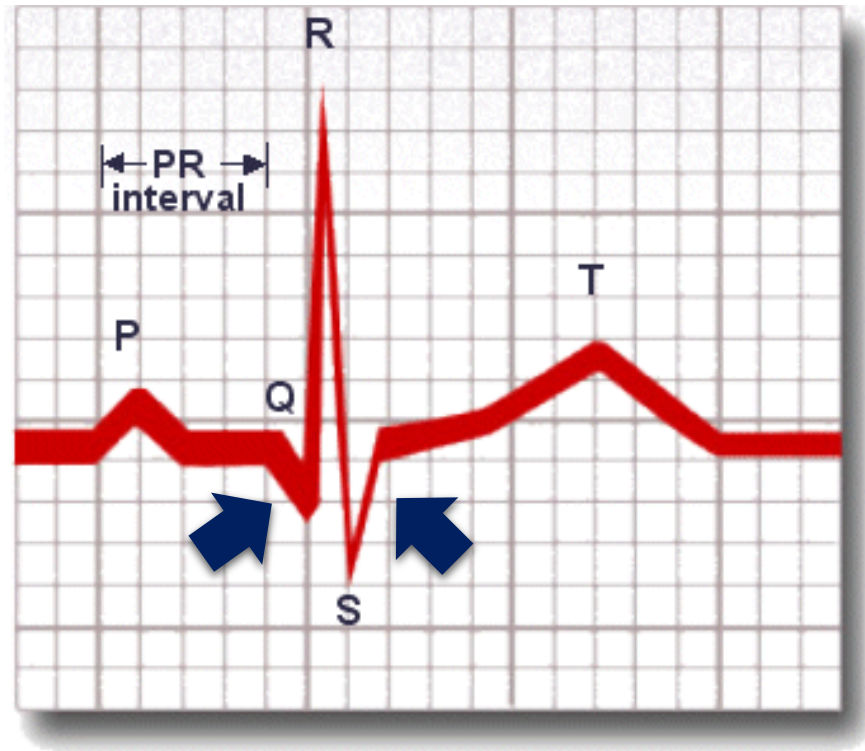
هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في هذا الموقع هم
تحت حماية قانون الملكية الفكرية و لا يحق لأحد إستخدامه أو إستنساخه أو
تحميله على أى كمبيوتر أو إعادة طبعه أو طبع أجزاء منه بدون إذن مسبق من
الدكتور طارق عبد الحميد (أو من ينوب عنه قانونياً) . و من يتعدى على
الملكية الفكرية المذكورة فسوف يتعرض للمسائلة القضائية عن جريمة إنتهاك
حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول
فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص برجاء
الإتصال بالدكتور طارق عبد الحميد



QRS Complex



Millivolts



Milliseconds

Q

The first –ve wave (after P wave) not preceded by any other deflections.

R

The first +ve deflection after the Q wave

S

The first –ve deflection following a positive one



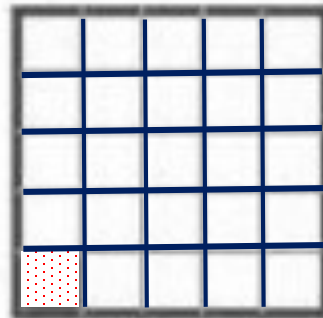
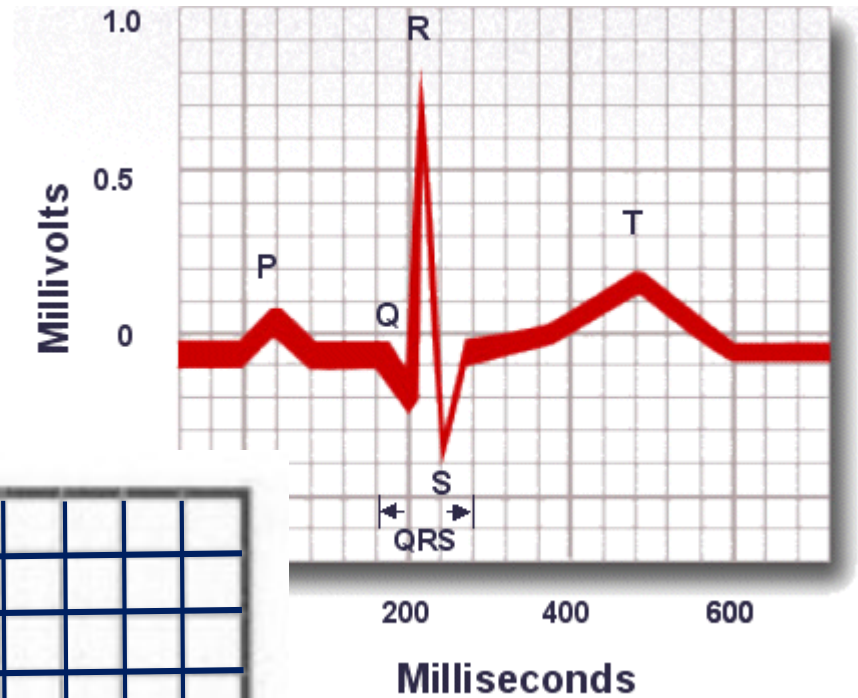


1 QRS Represents Ventricular Depolarization



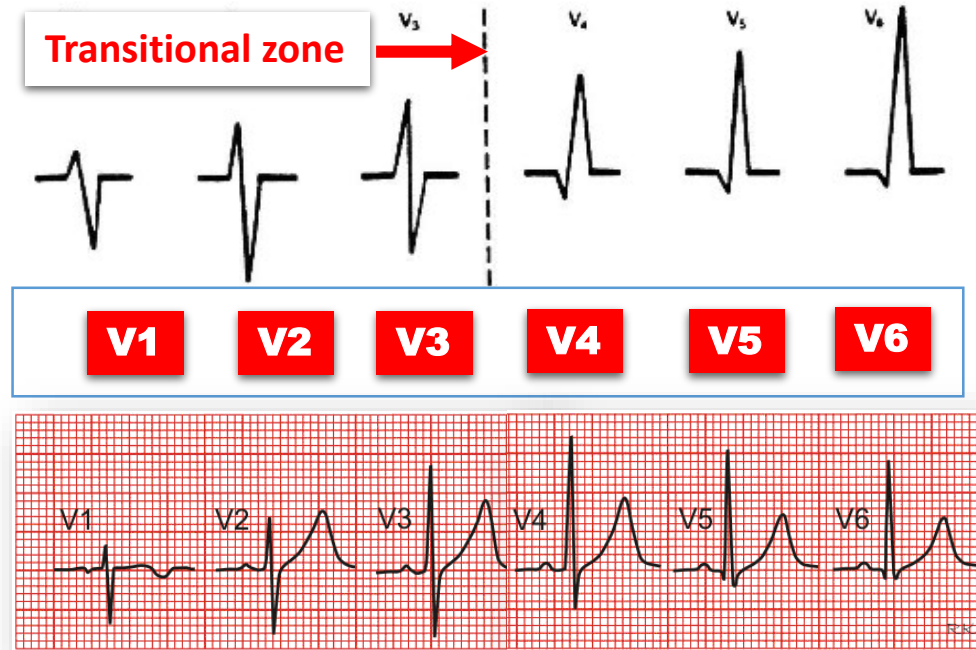


**② Its duration should not exceed 0.11 seconds
(i.e. less than 3 small squares)**

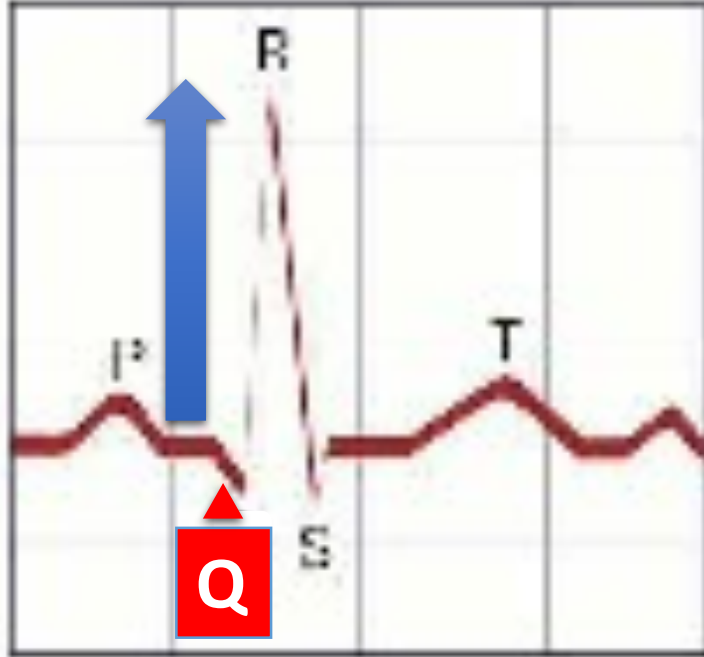


0.04 Sec

3 Its voltage amplitude increases normally from V1 to V6



Voltage Amplitude



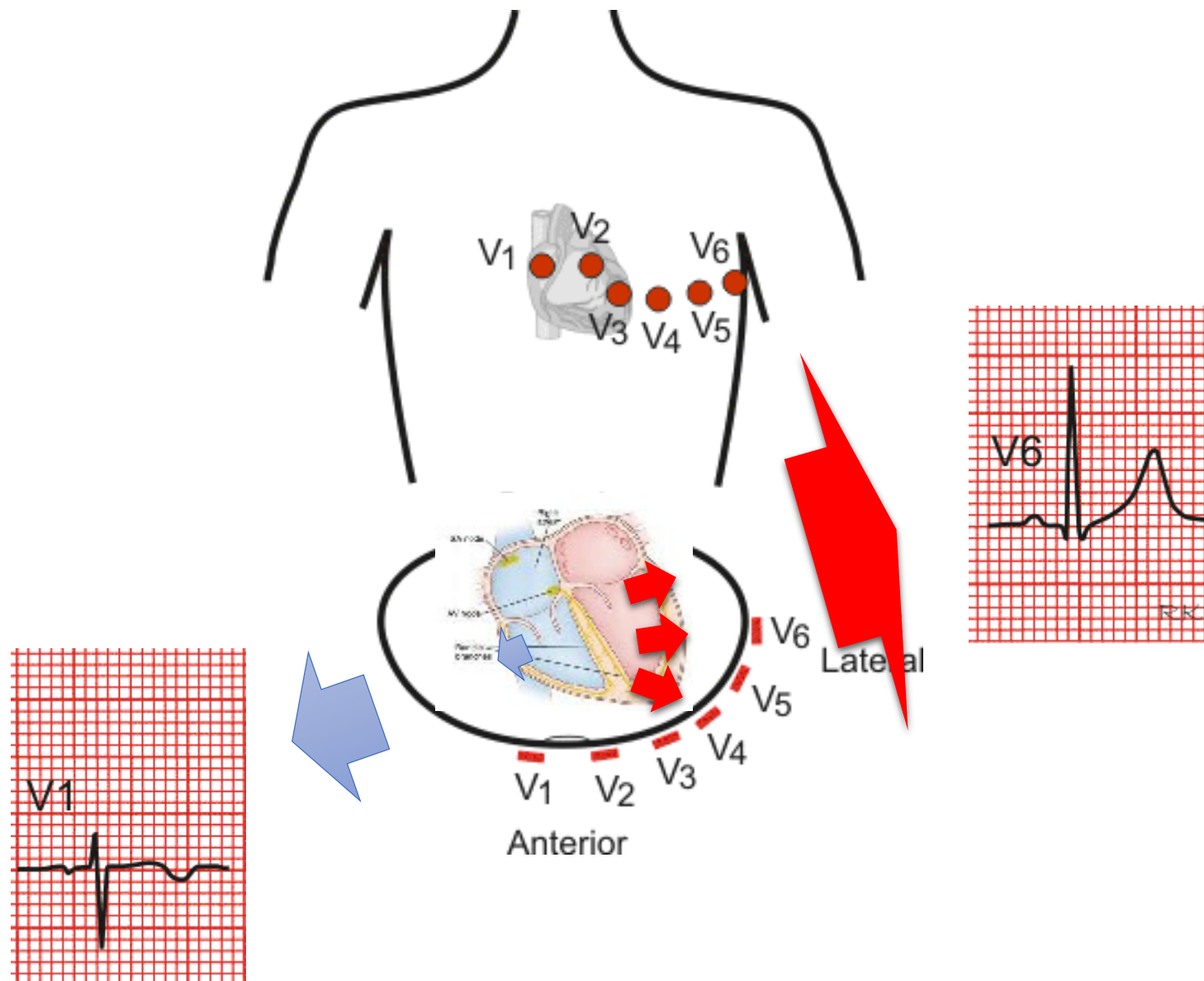
Duration

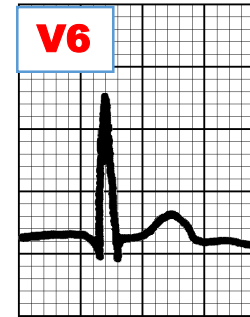
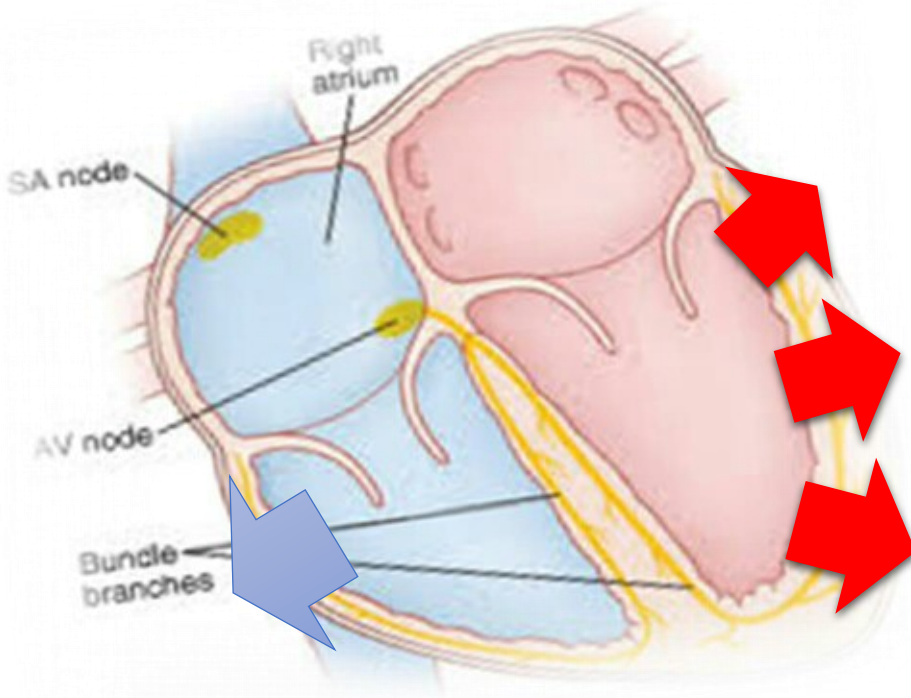
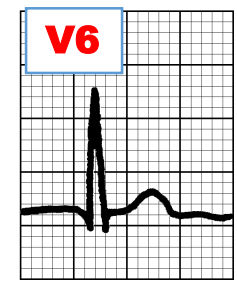
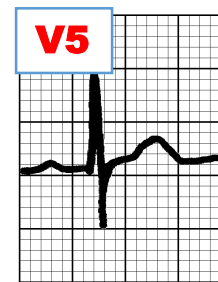
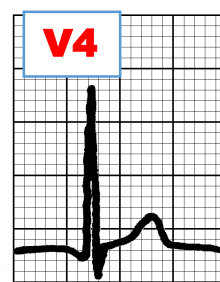
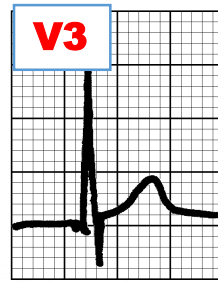
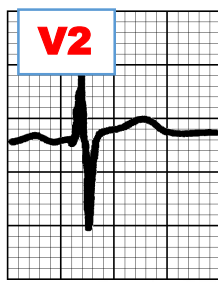
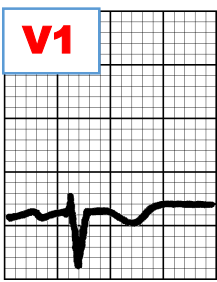
1 Voltage Amplitude

2 Duration

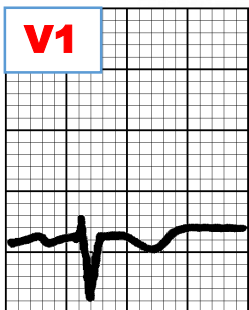
3 Q wave

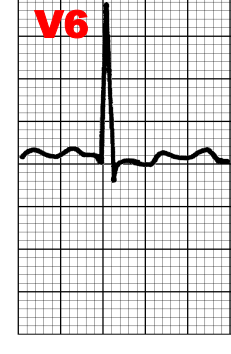
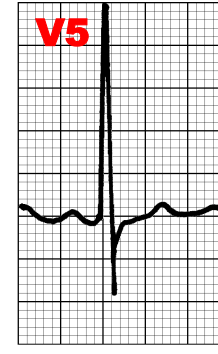
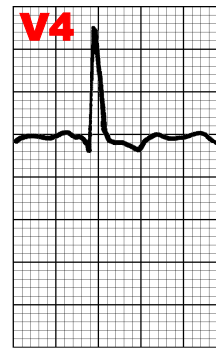
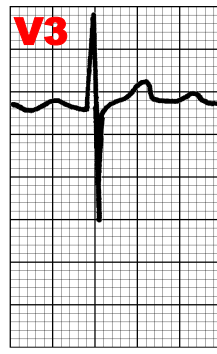
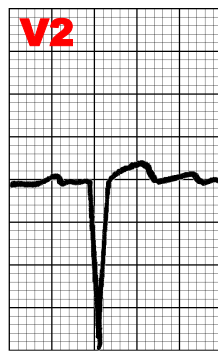
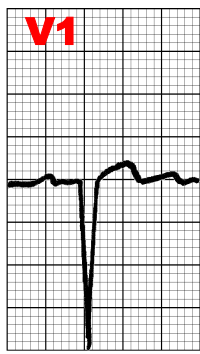
1 Voltage Amplitude



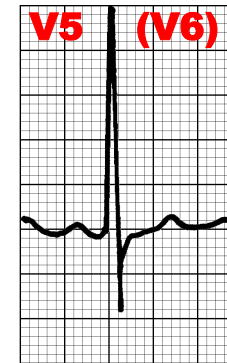
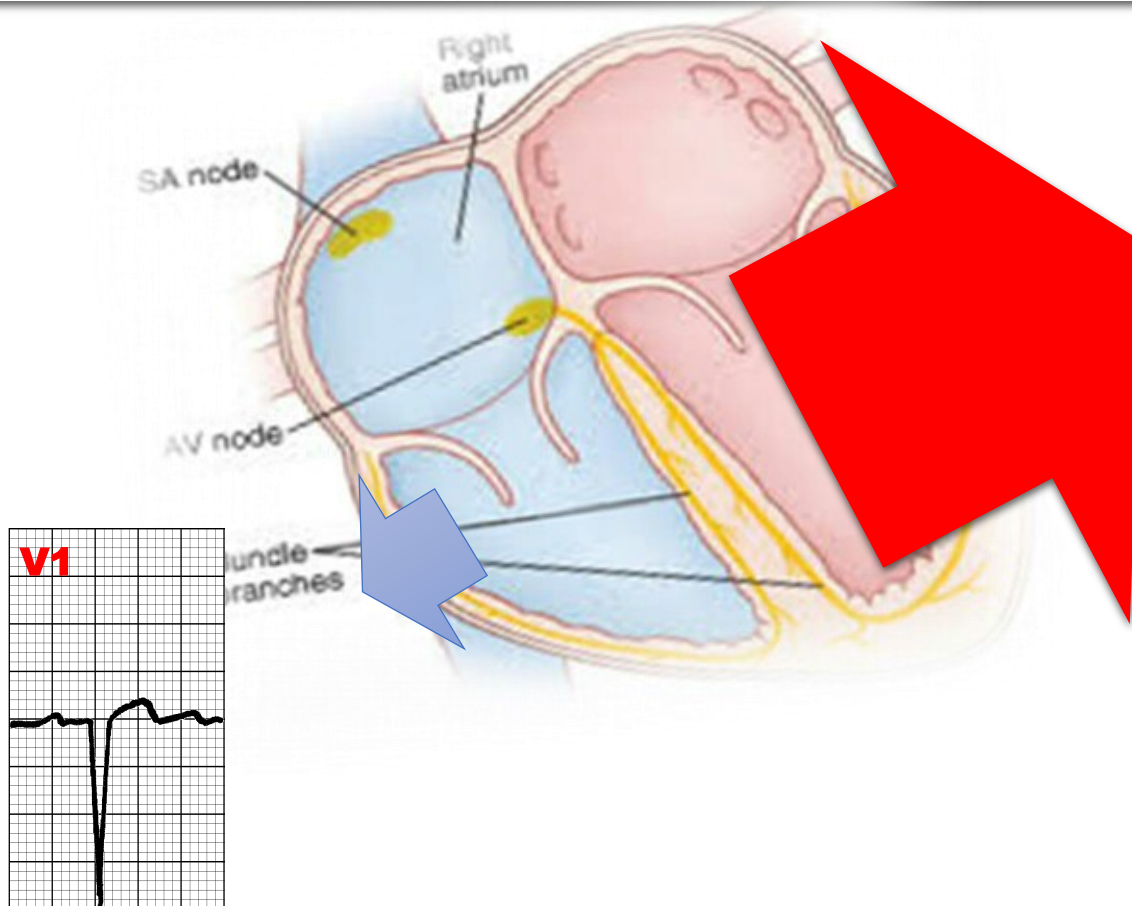


Normal

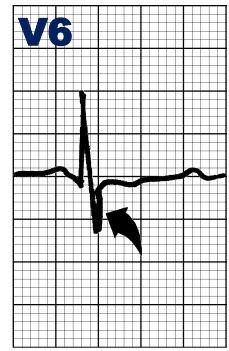
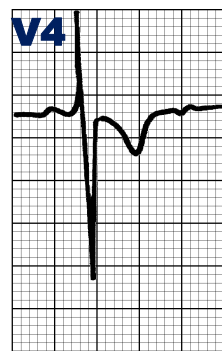
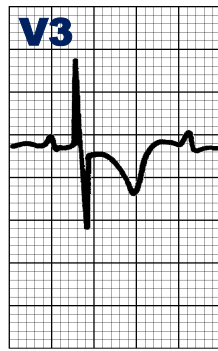
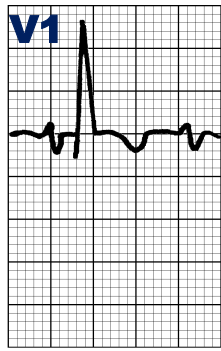




The -ve S in V1 plus the +ve R in V5 or V6 is greater than 35 small squares

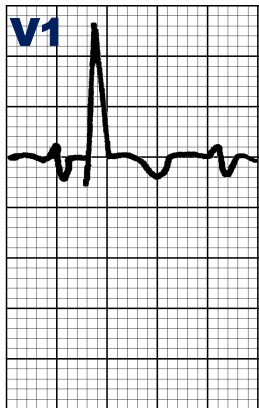
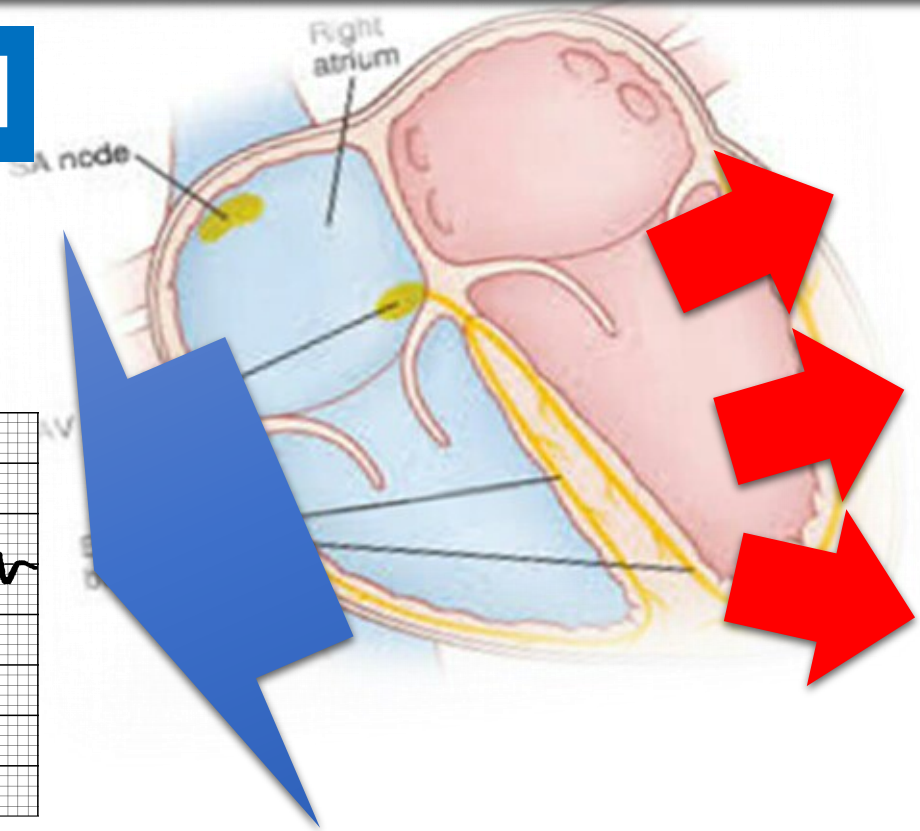


LVH



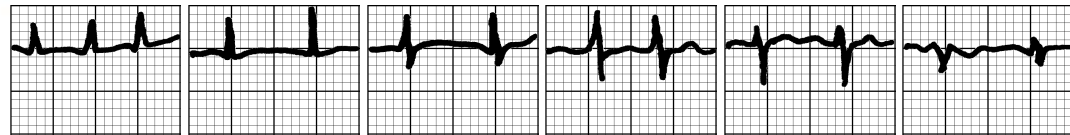
+ve R in V1 plus deep -ve S in left chest leads (V5-V6)

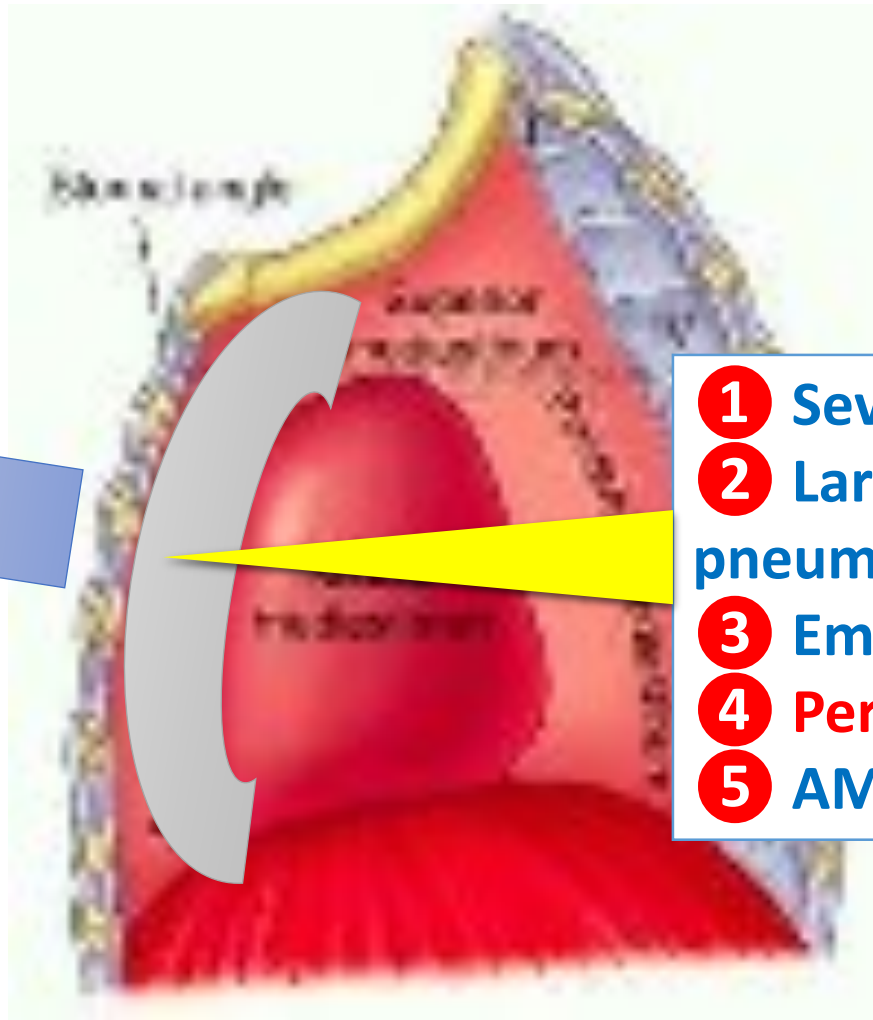
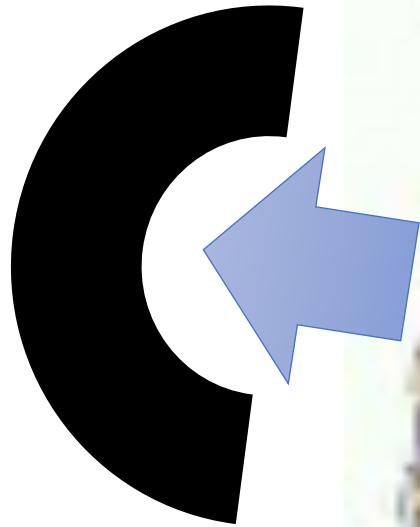
RVH



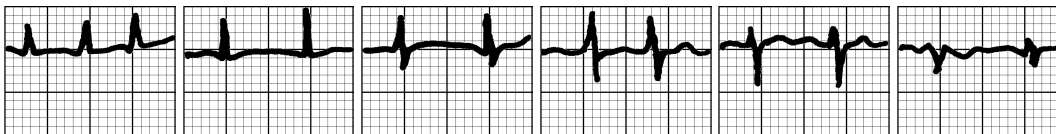
Low voltage ECG

- ① QRS voltage amplitude is less than 10 small squares in ALL Chest Leads
- OR/
- ② QRS voltage amplitude is less than 5 small squares in ALL Limb Leads





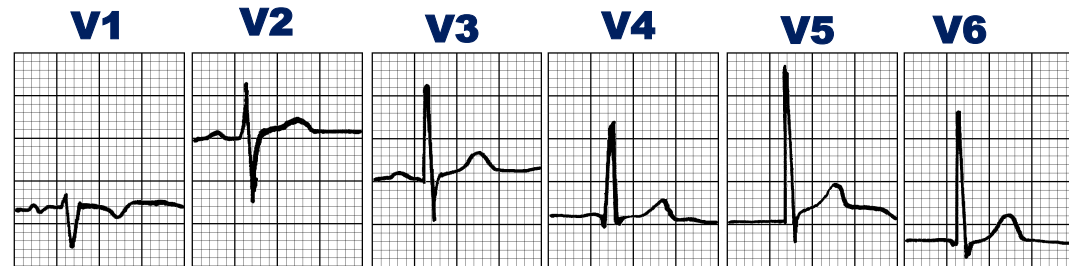
- ① Severe Obesity
- ② Large left pneumothorax
- ③ Emphysema
- ④ Pericardial Effusion
- ⑤ AMI



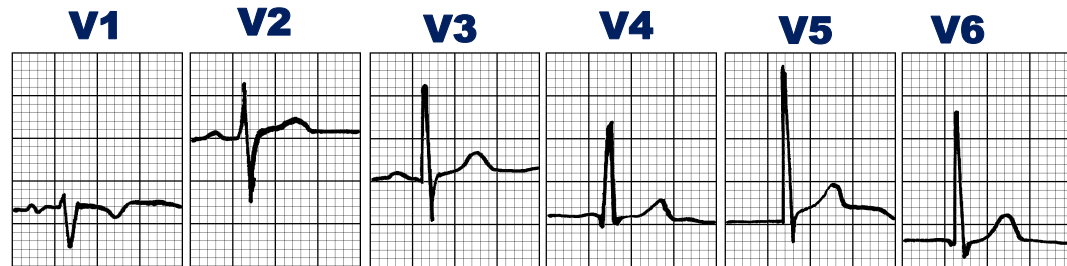
**Let us revise
the QRS
Voltage
Amplitude**



QRS Complex: Voltage Amplitude

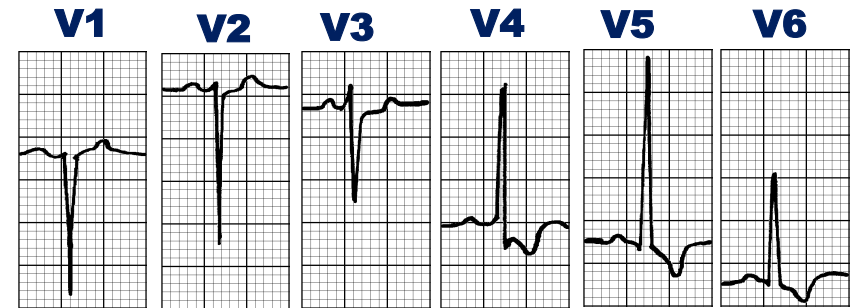


QRS Complex: Voltage Amplitude

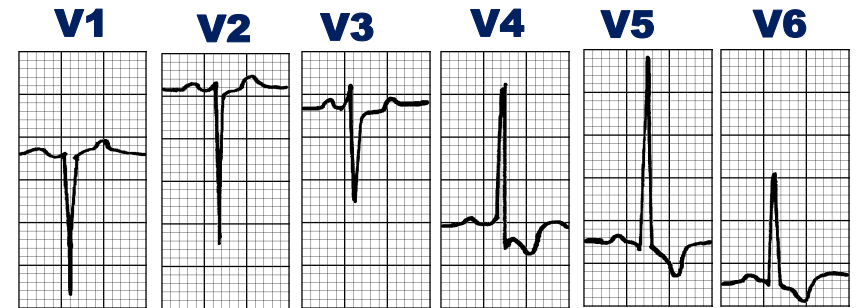


**Normal
Heart**

QRS Complex: Voltage Amplitude

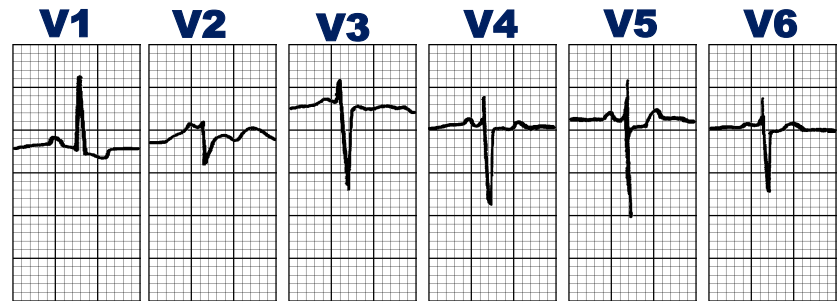


QRS Complex: Voltage Amplitude

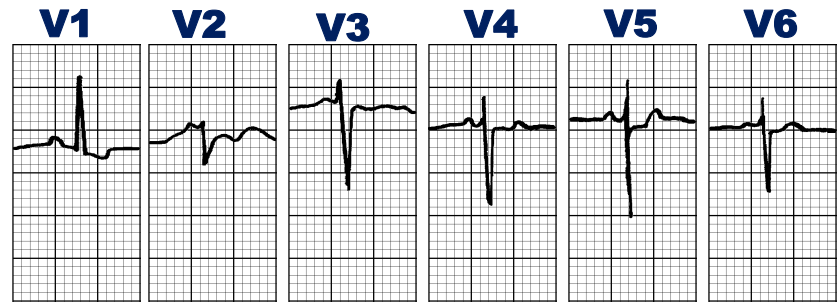


LVH

QRS Complex: Voltage Amplitude

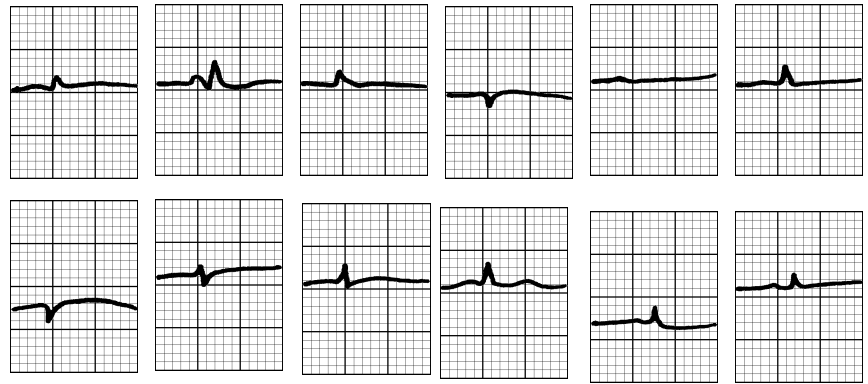


QRS Complex: Voltage Amplitude

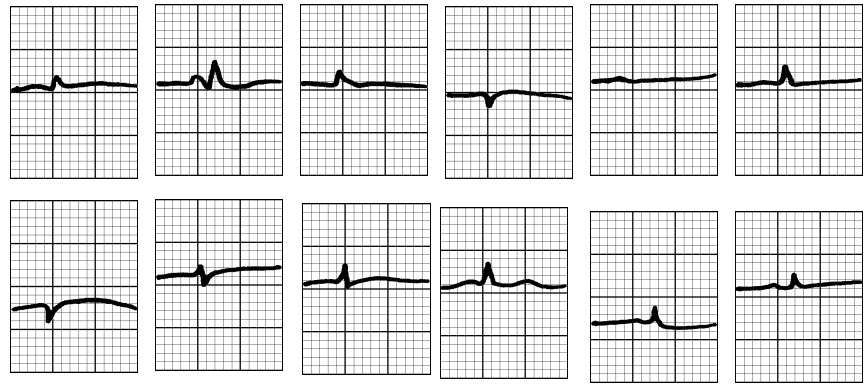


RVH

QRS Complex: Voltage Amplitude



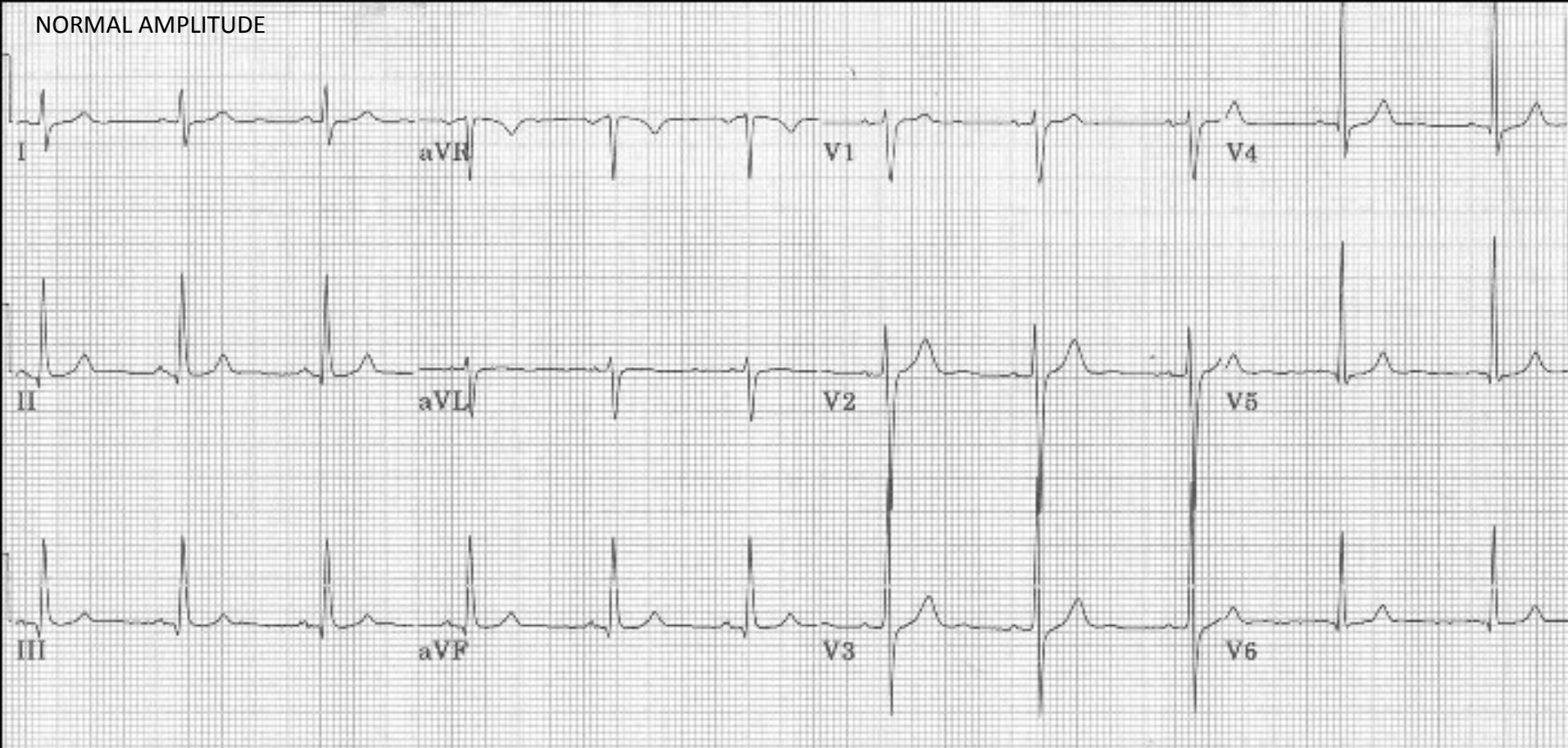
QRS Complex: Voltage Amplitude



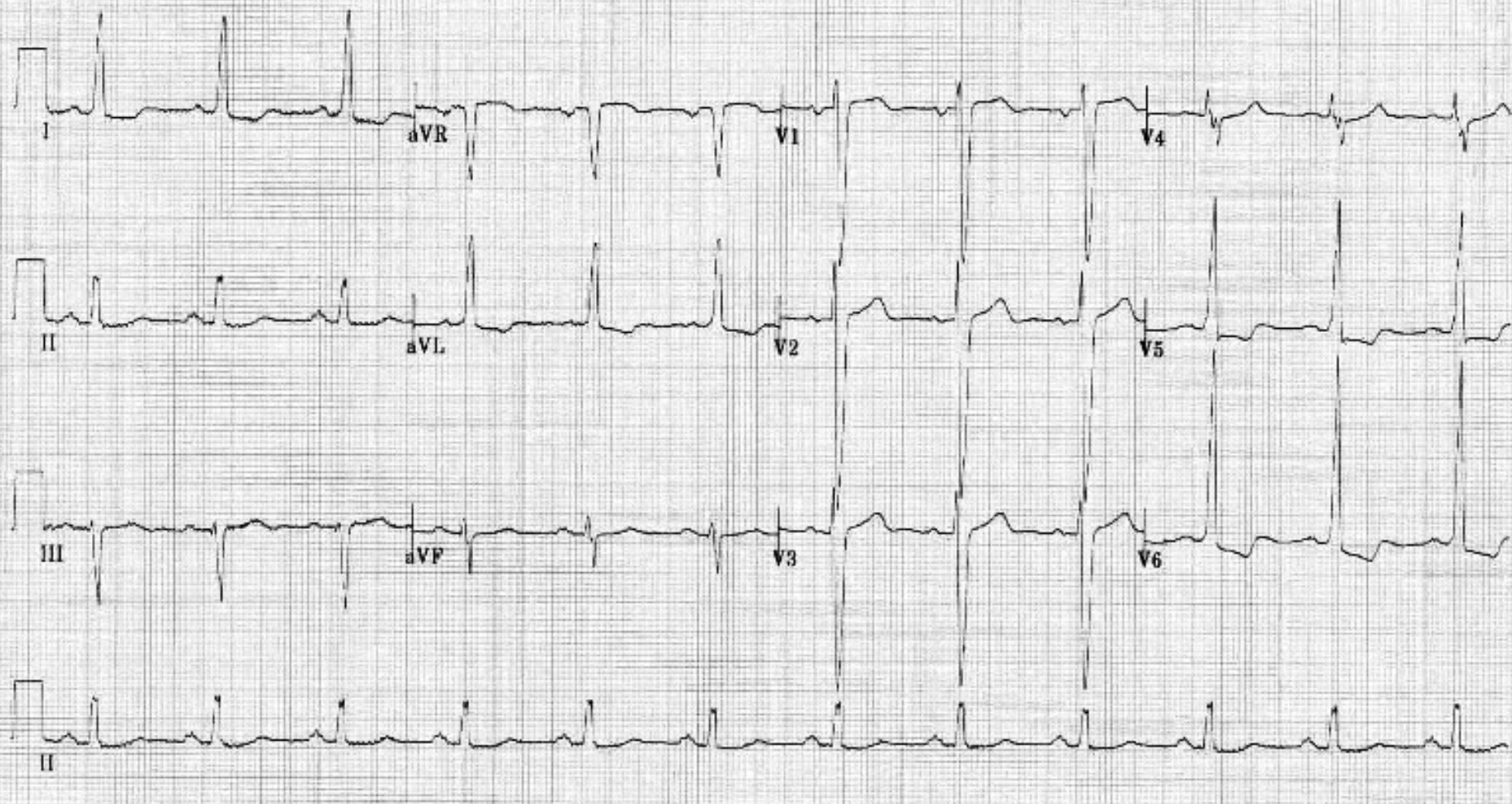
Low voltage ECG



NORMAL AMPLITUDE



LVH



Female Caucasian

RVH

Age 18

I

aVR

V1

V4

II

aVL

V2

V5

III

aVF

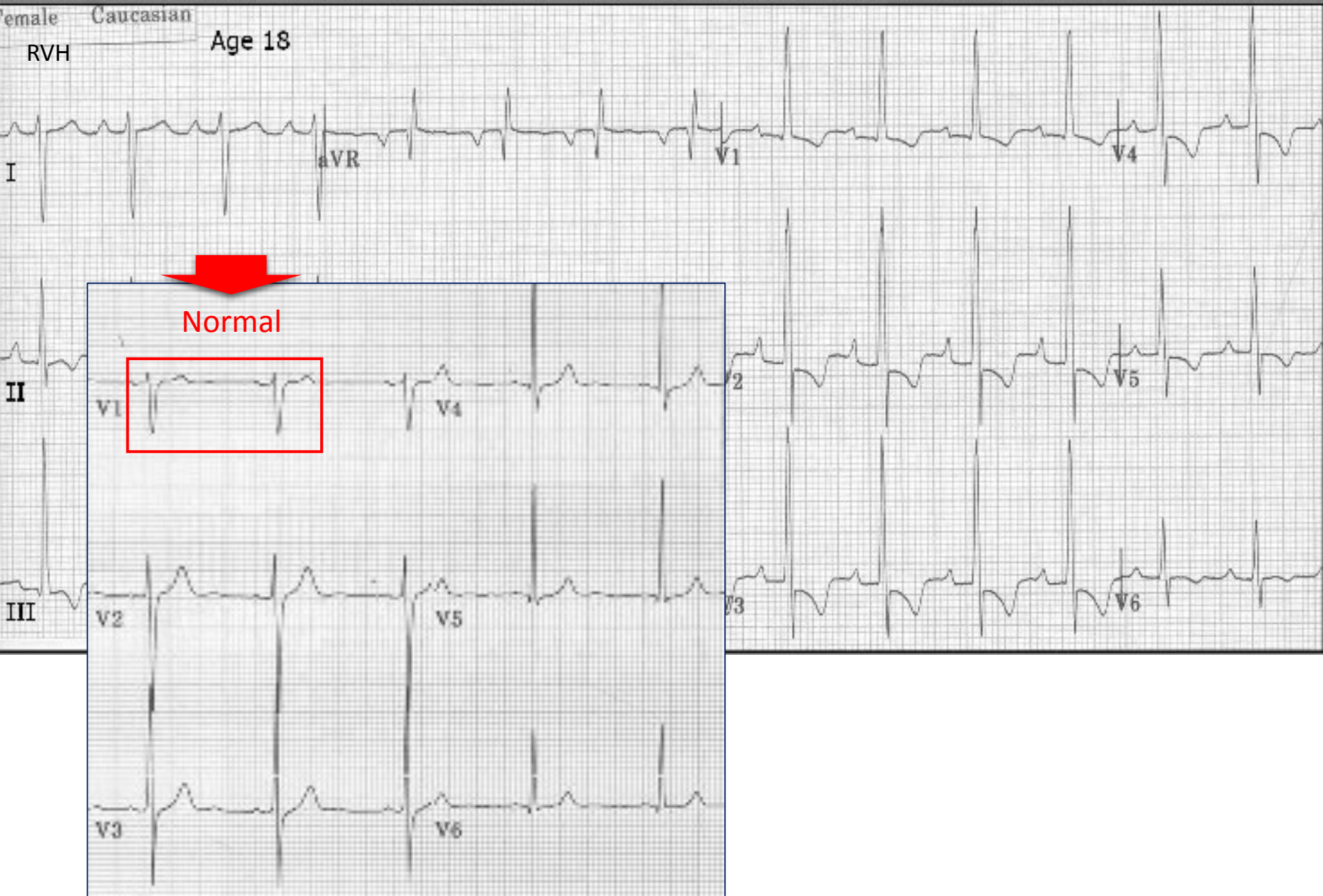
V3

V6

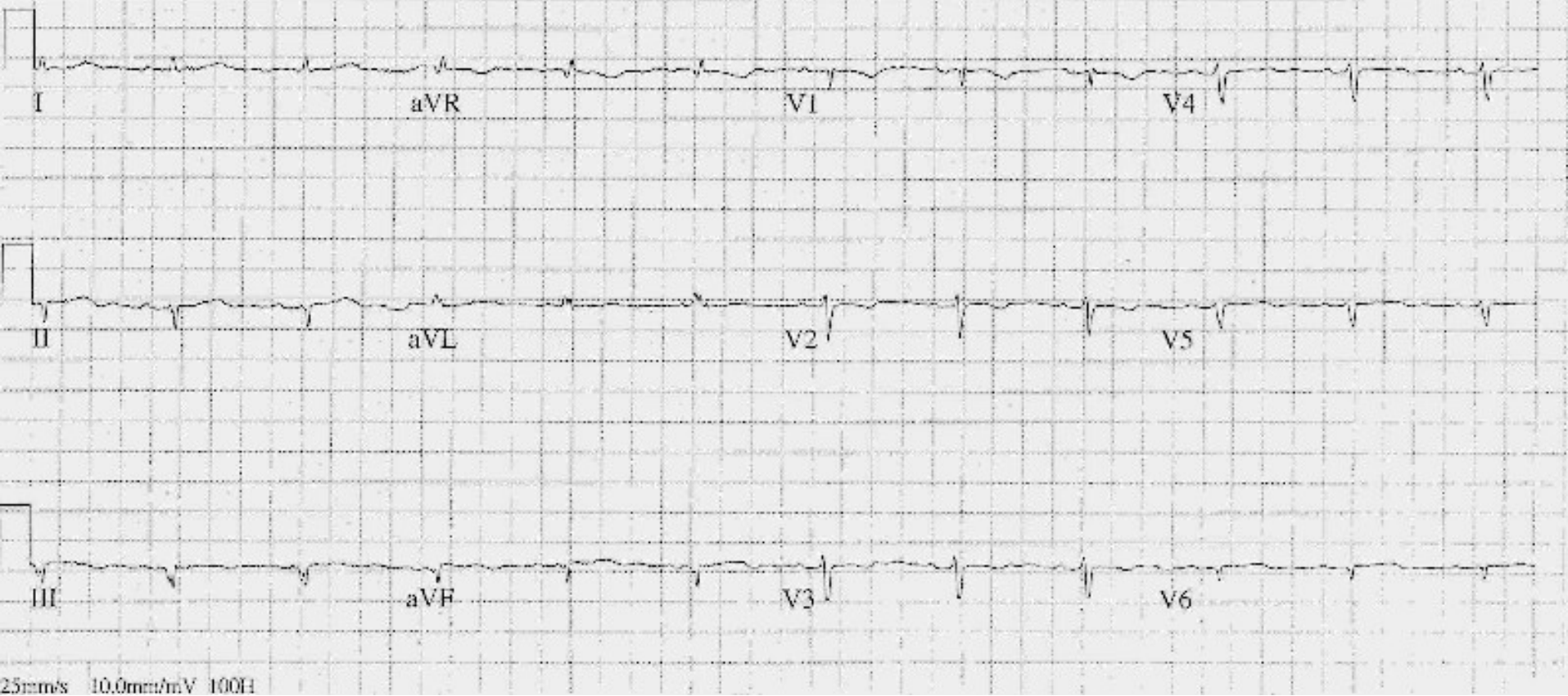
Female Caucasian

Age 18

RVH



Low Voltage ECG

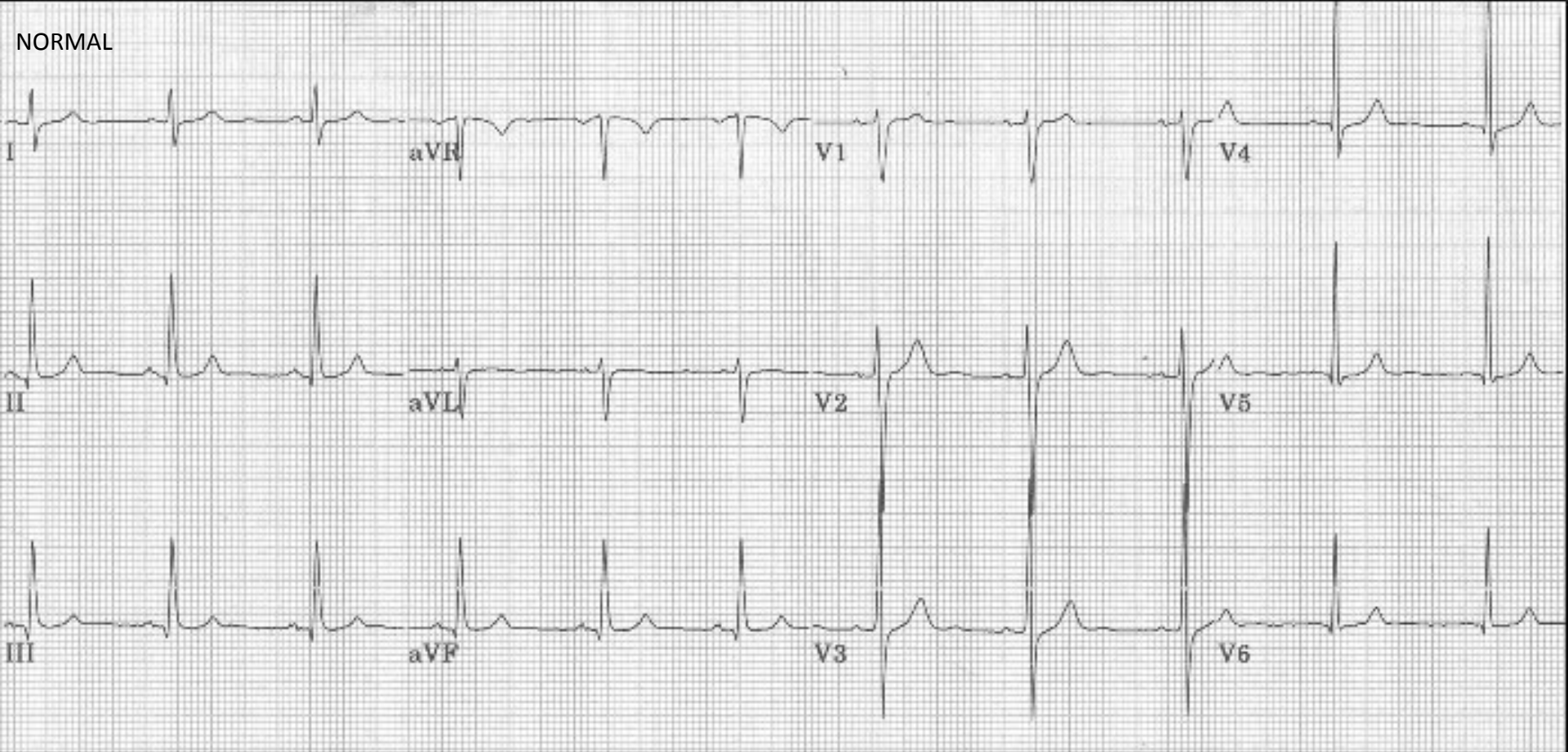


Test Yourself



Comment on the QRS Complex

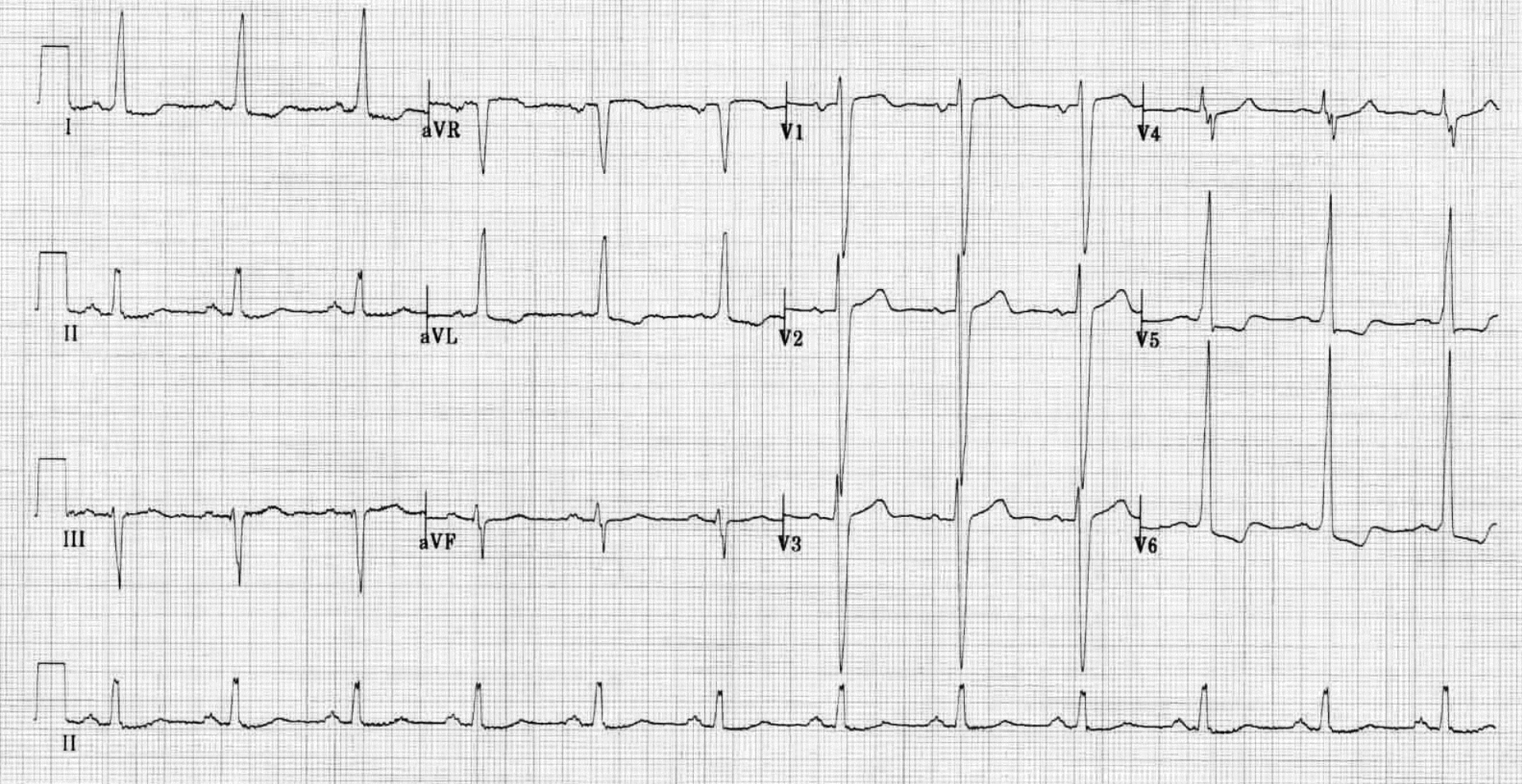




① Normal Amplitude

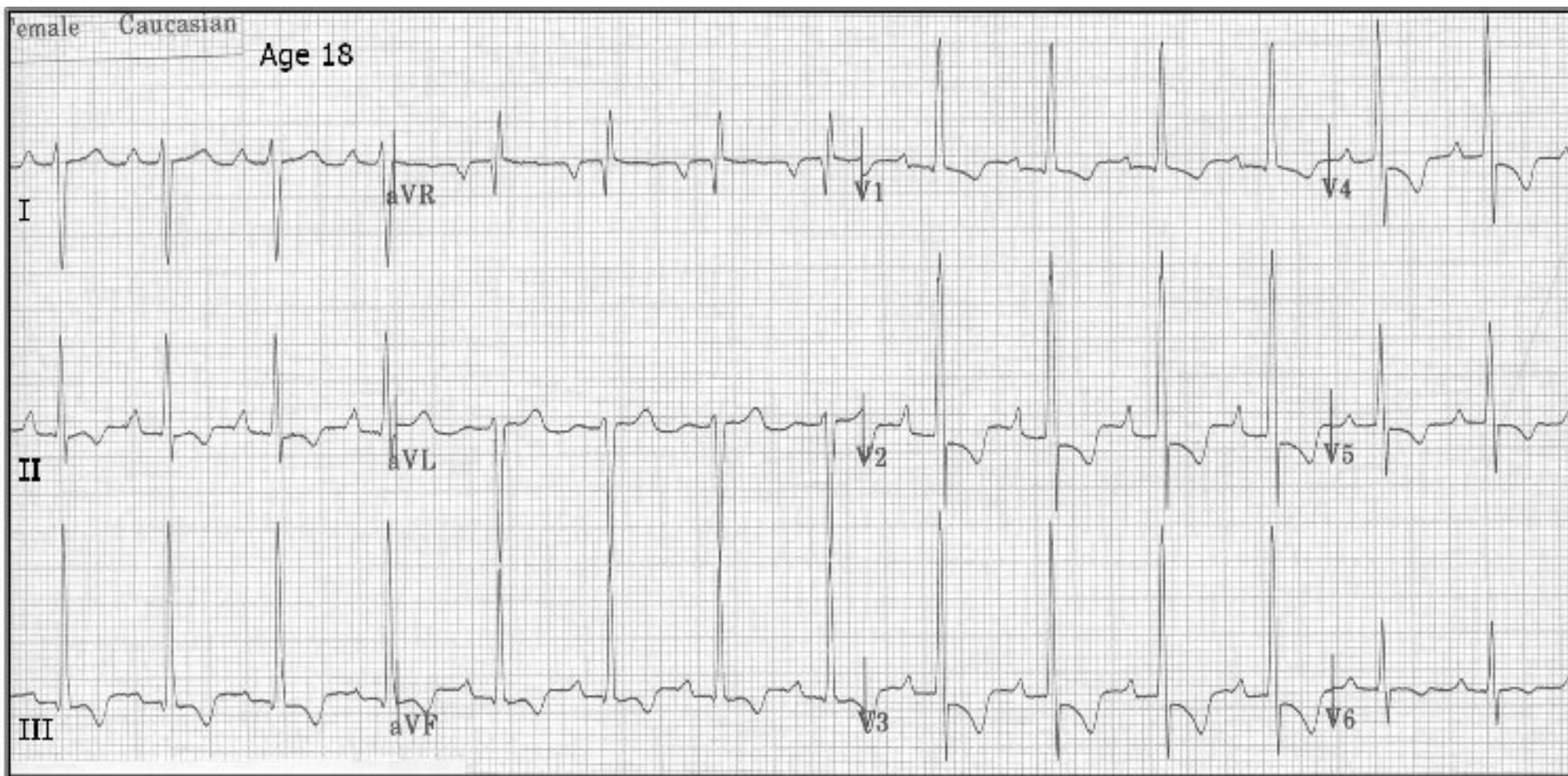
② Abnormal Amplitude

LVH



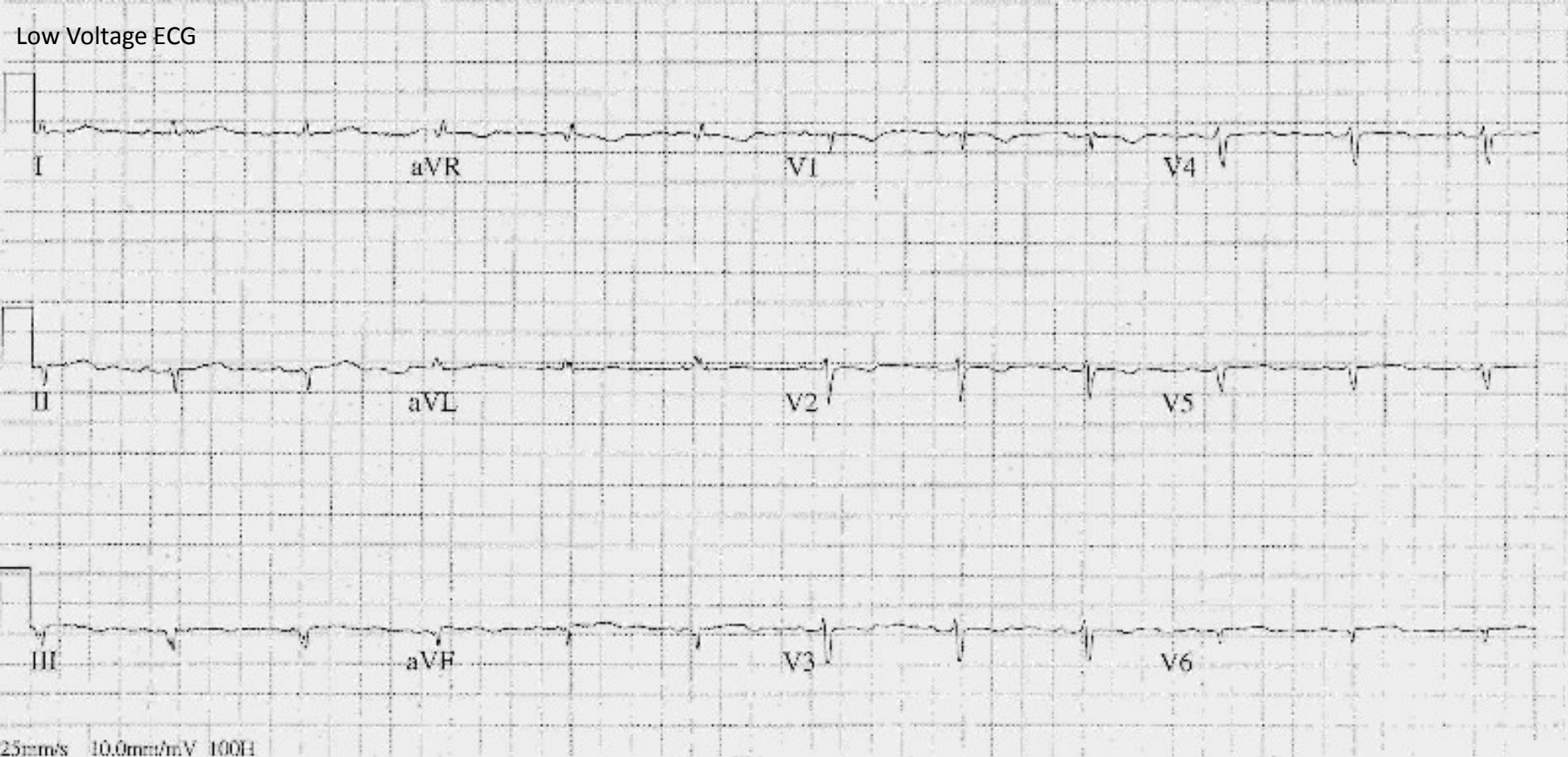
① Normal Amplitude

② Increased Amplitude



① Normal in V1

② Abnormal in V1



① Normal Amplitude

② High Amplitude

③ Low Voltage ECG

T Wave

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

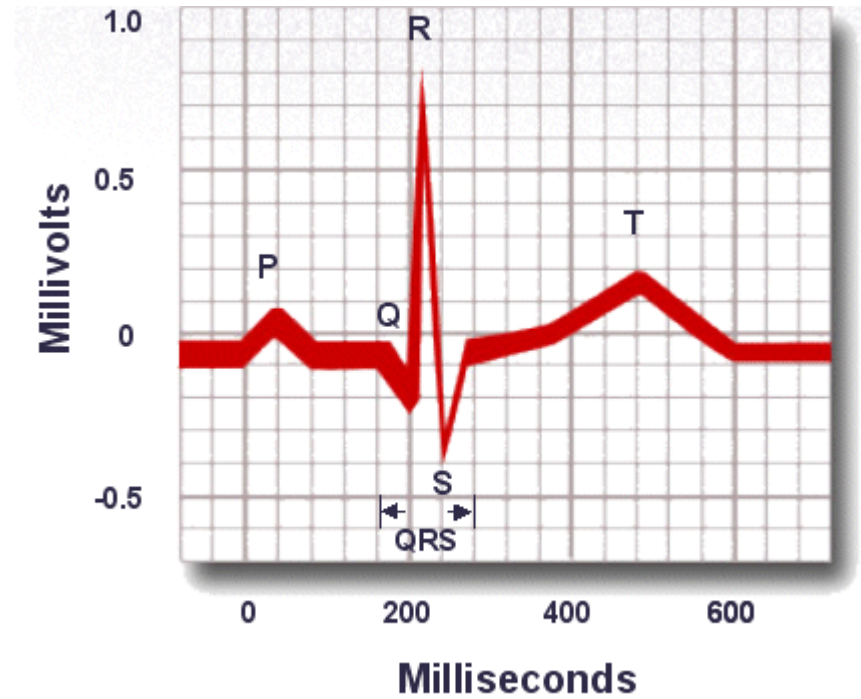
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تحميله على أى كمبيوتر أو إعادة طبعه أو طبع أجزاء منه بدون إذن مسبق من
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حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول
فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص بـرجاء
الإتصال بالدكتور طارق عبد الحميد



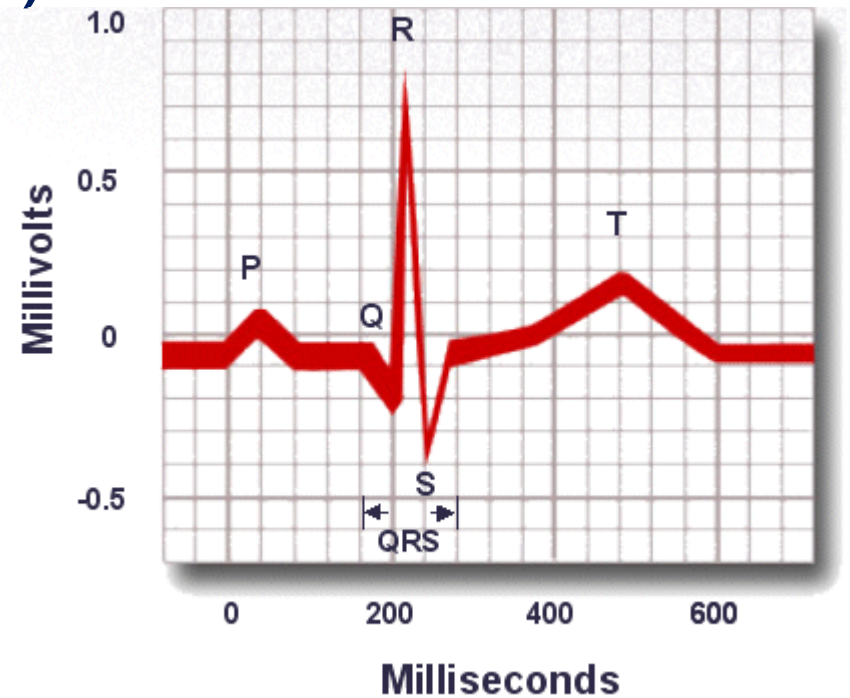
T wave

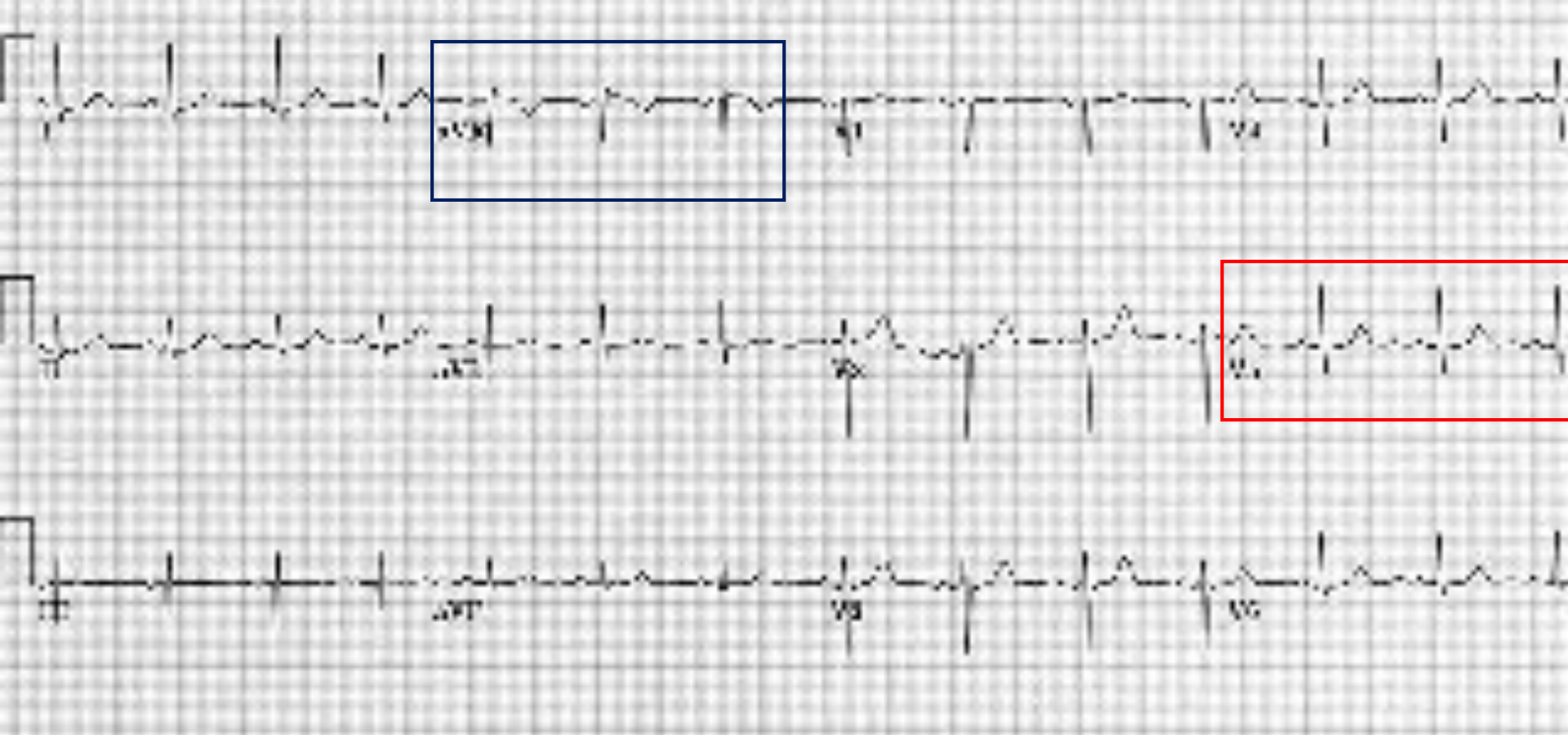


① Produced by Ventricular Repolarization



2 Follow the direction of the QRS
(i.e. +ve in most leads and -ve in
aVR)

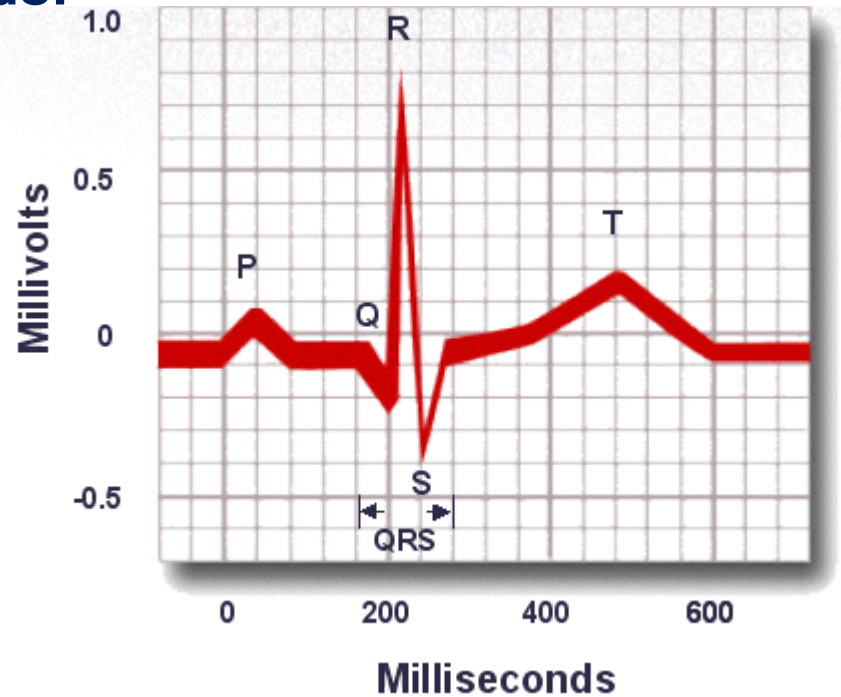


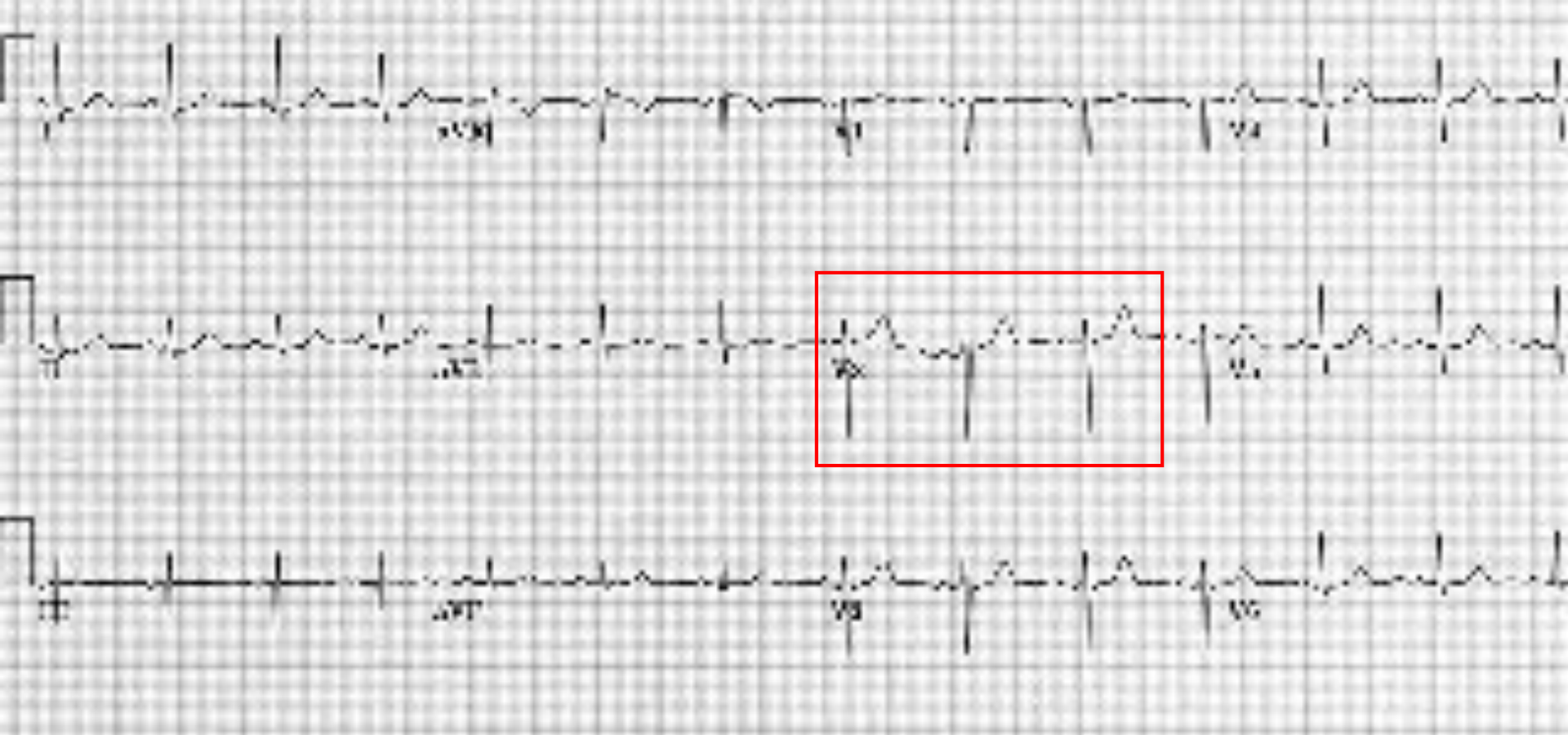


Normal

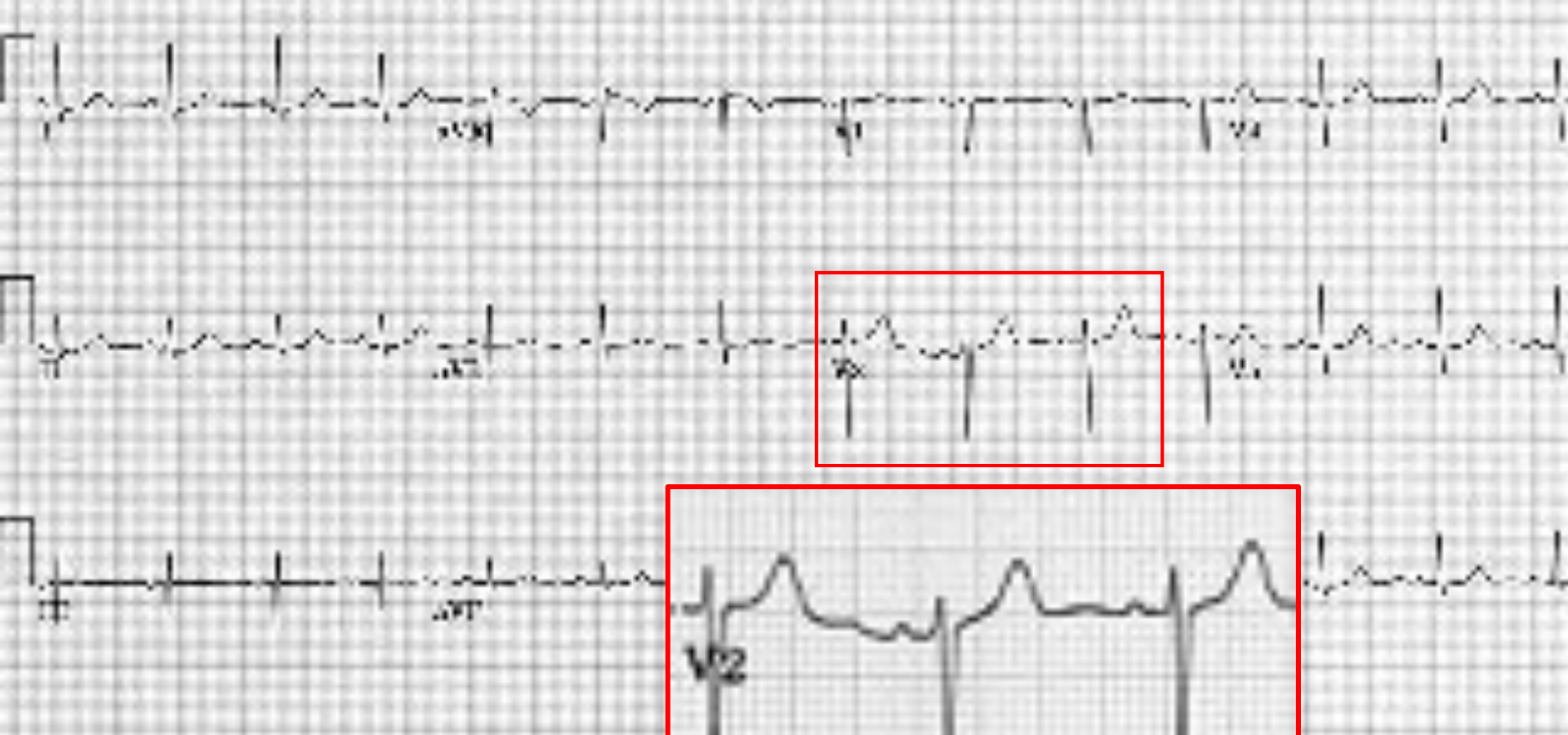


③ Its height is usually not more than 5 small squares in Limb Leads and 10 small squares in Chest Leads.



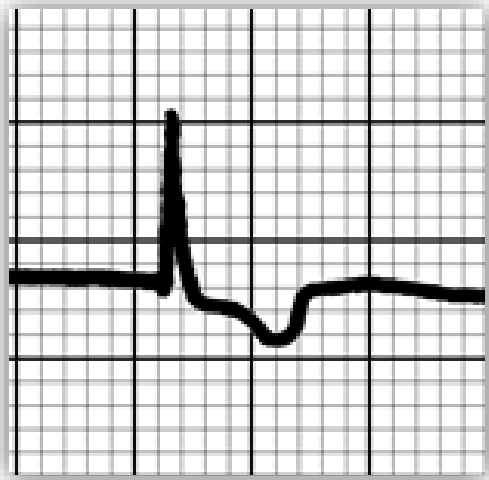


Normal

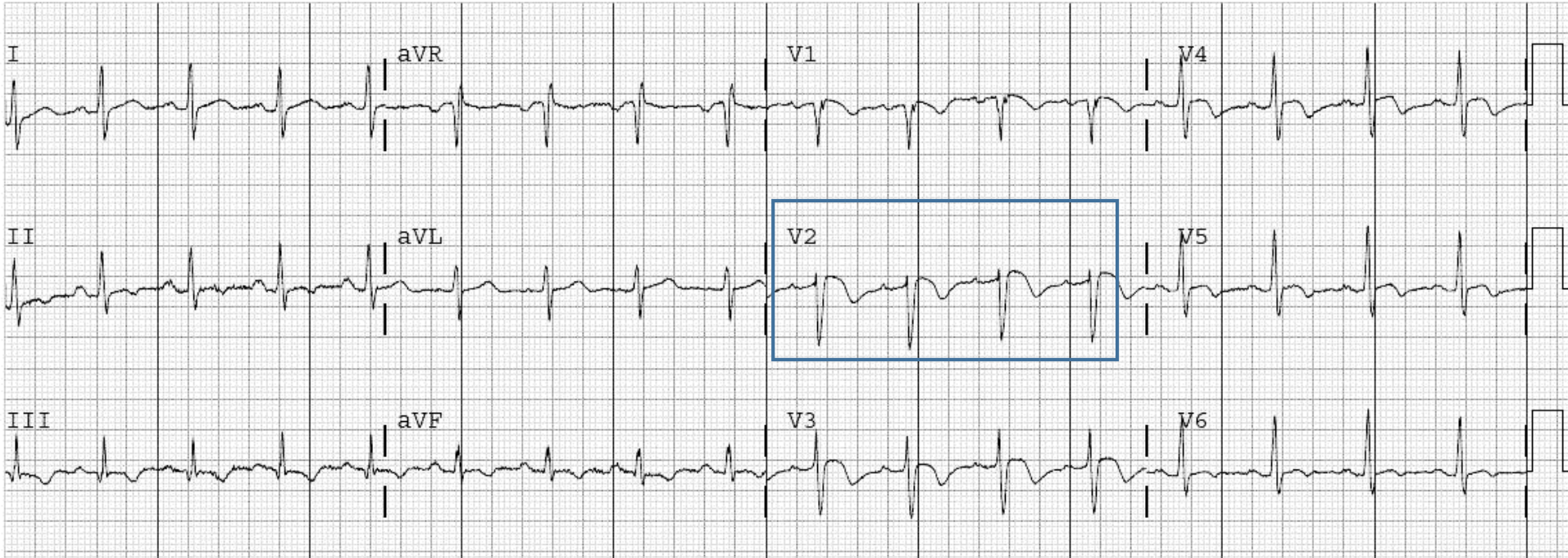


Normal

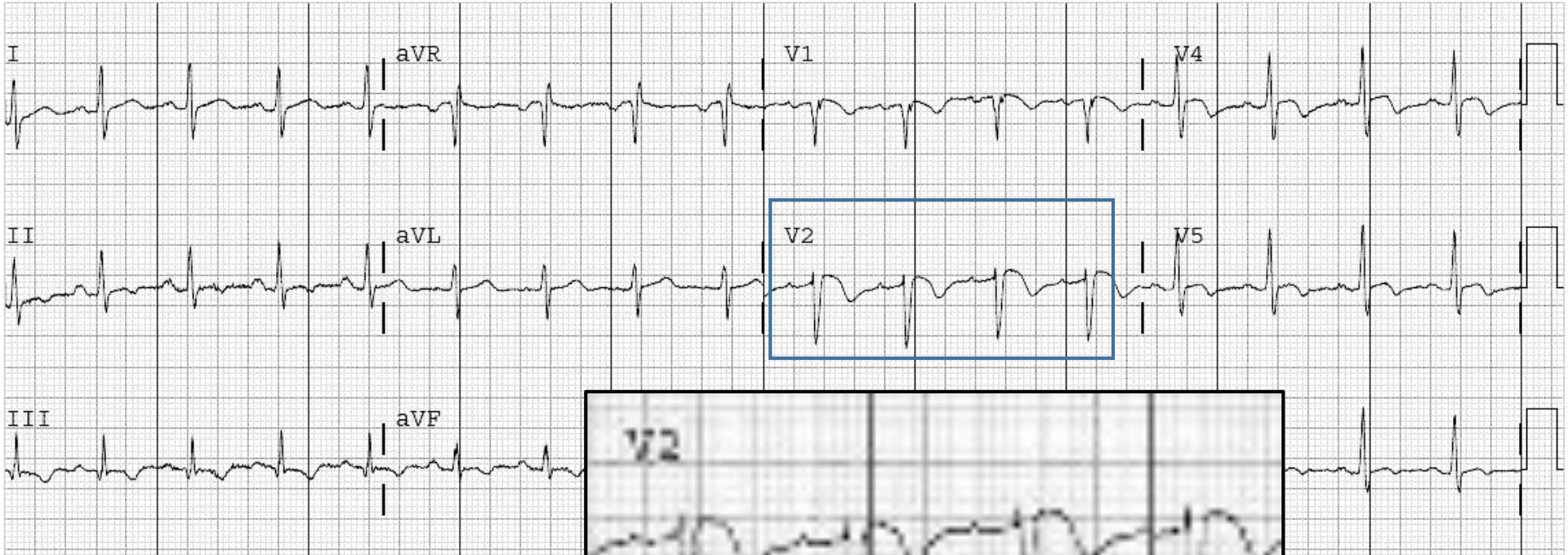
Causes of T wave inversion



- 1 Ventricular ischemia
- 2 Ventricular strain e.g. Pulmonary hypertension Systemic hypertension Pulmonary embolism
- 3 Digitalis effect
- 4 Pericarditis
- 5 Cerebrovascular accidents
- 6 Associated with BBB

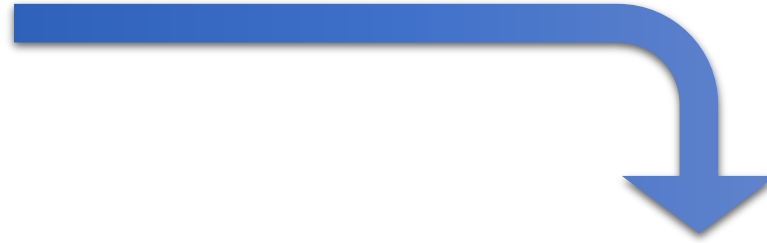
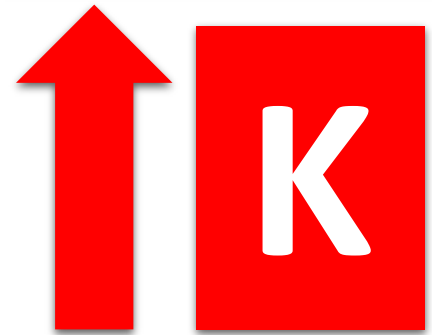


Inverted T waves

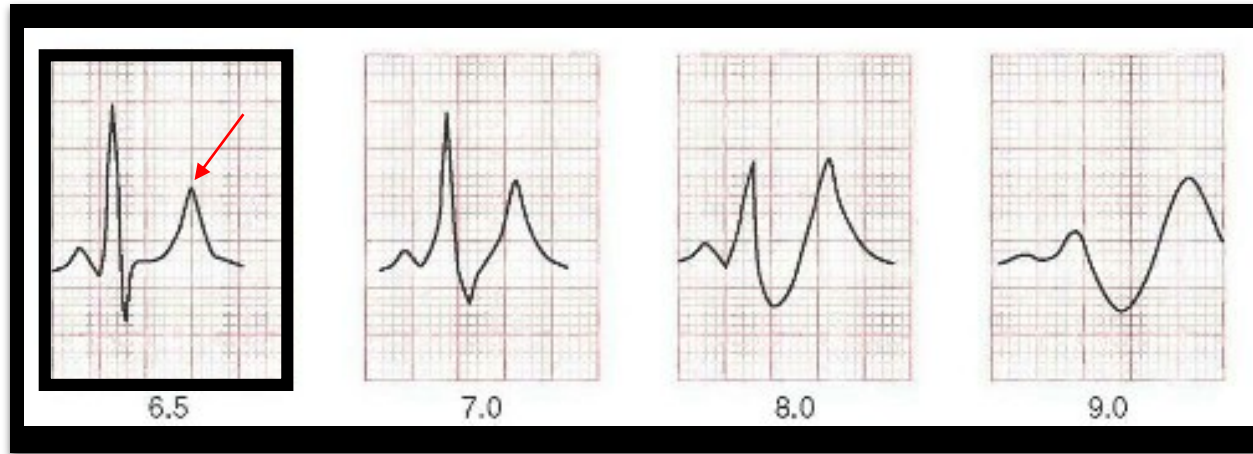


Inverted T waves

Tall peaked T waves

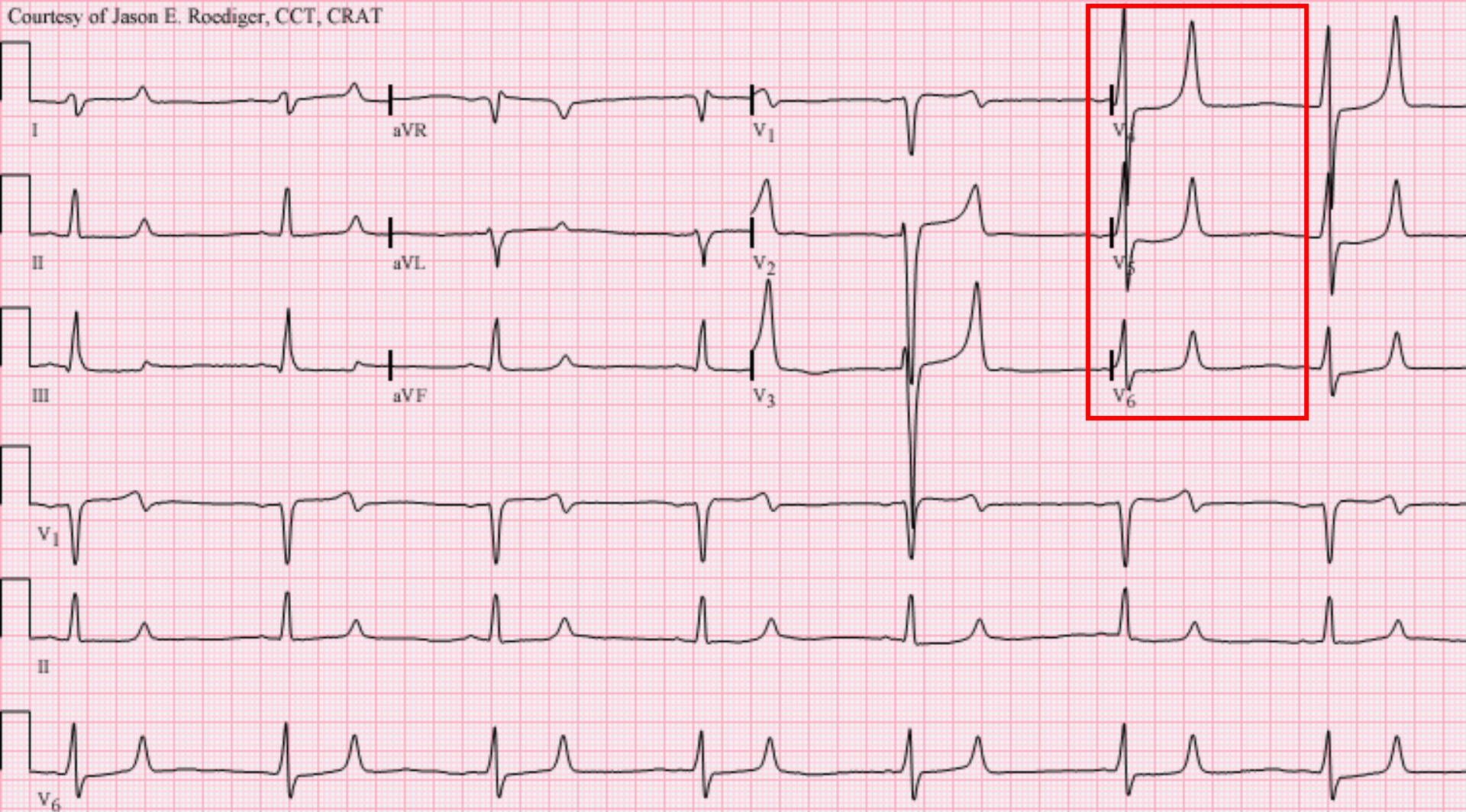


4 m Eq/L





Normal

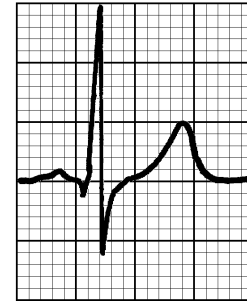


Hyperkalemia

**Let us revise
the T wave**

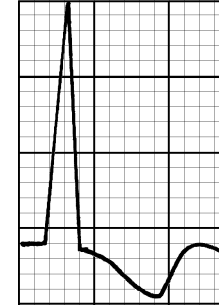


The T wave



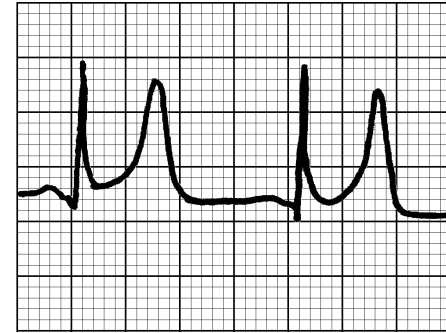
Normal T wave

The T wave



**Inverted T waves e.g.
in Cardiac Ischemia**

The T wave



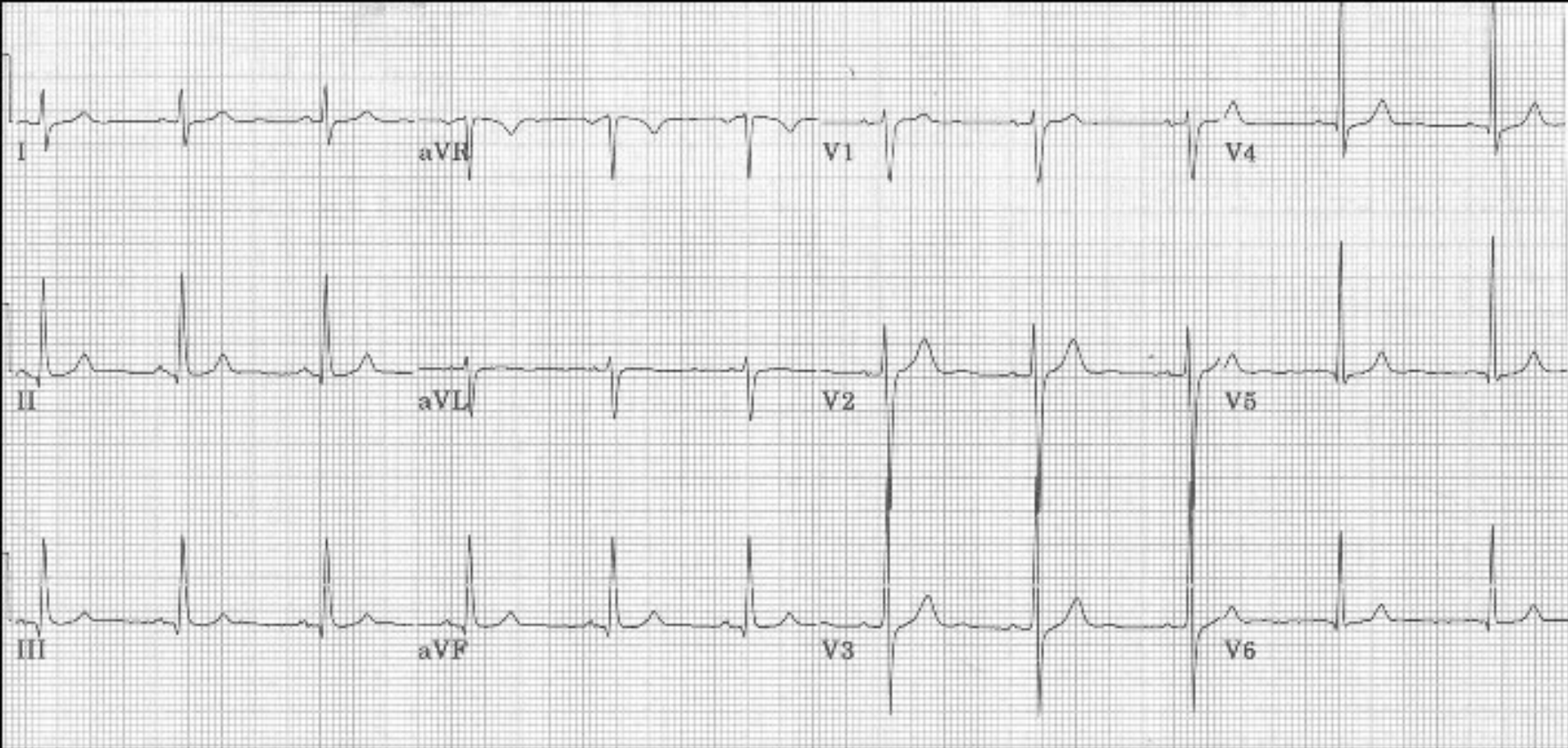
**Tall Peaked T
Waves in
Hyperkalemia**

Test Yourself

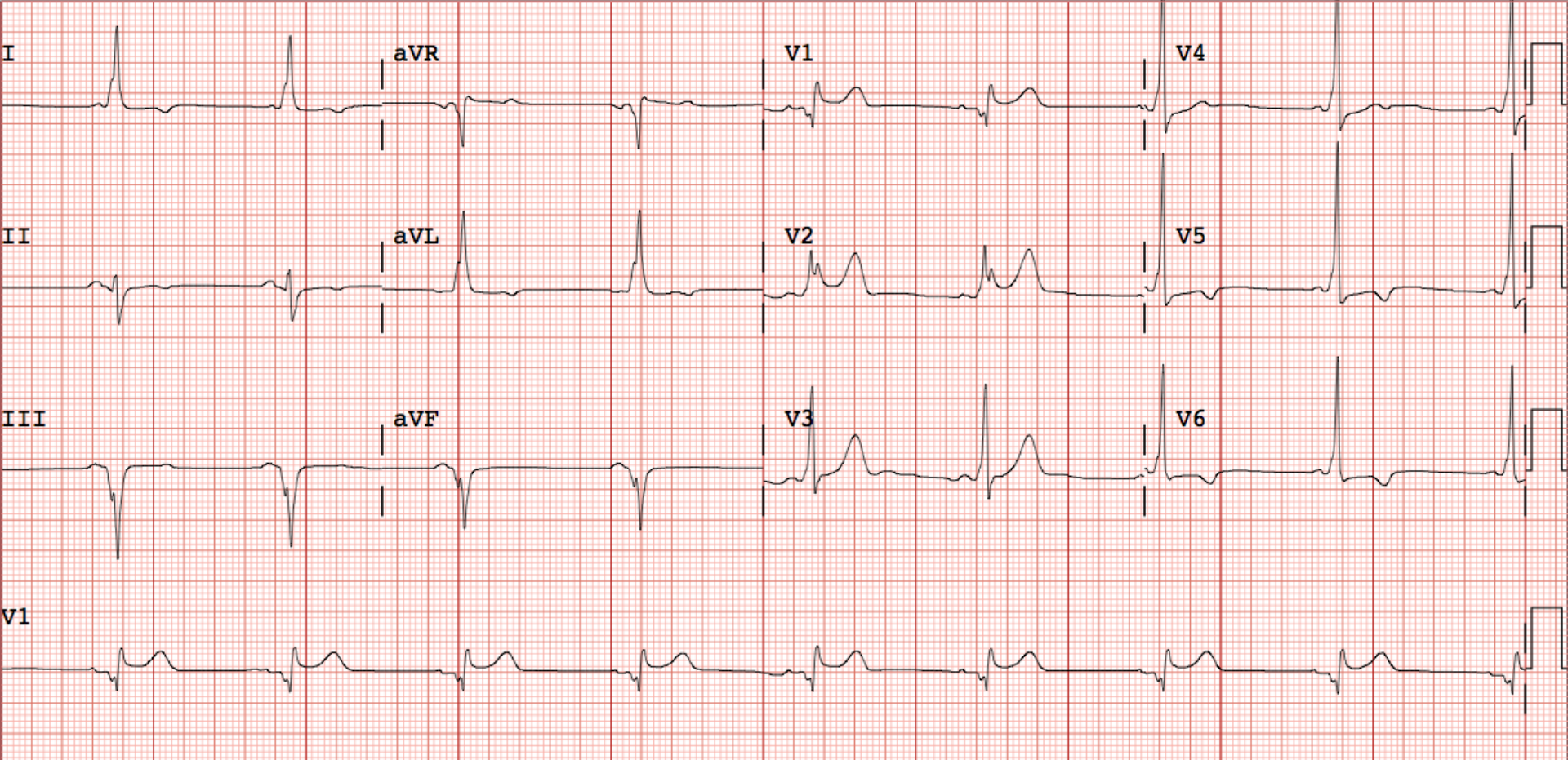


Comment on the T wave

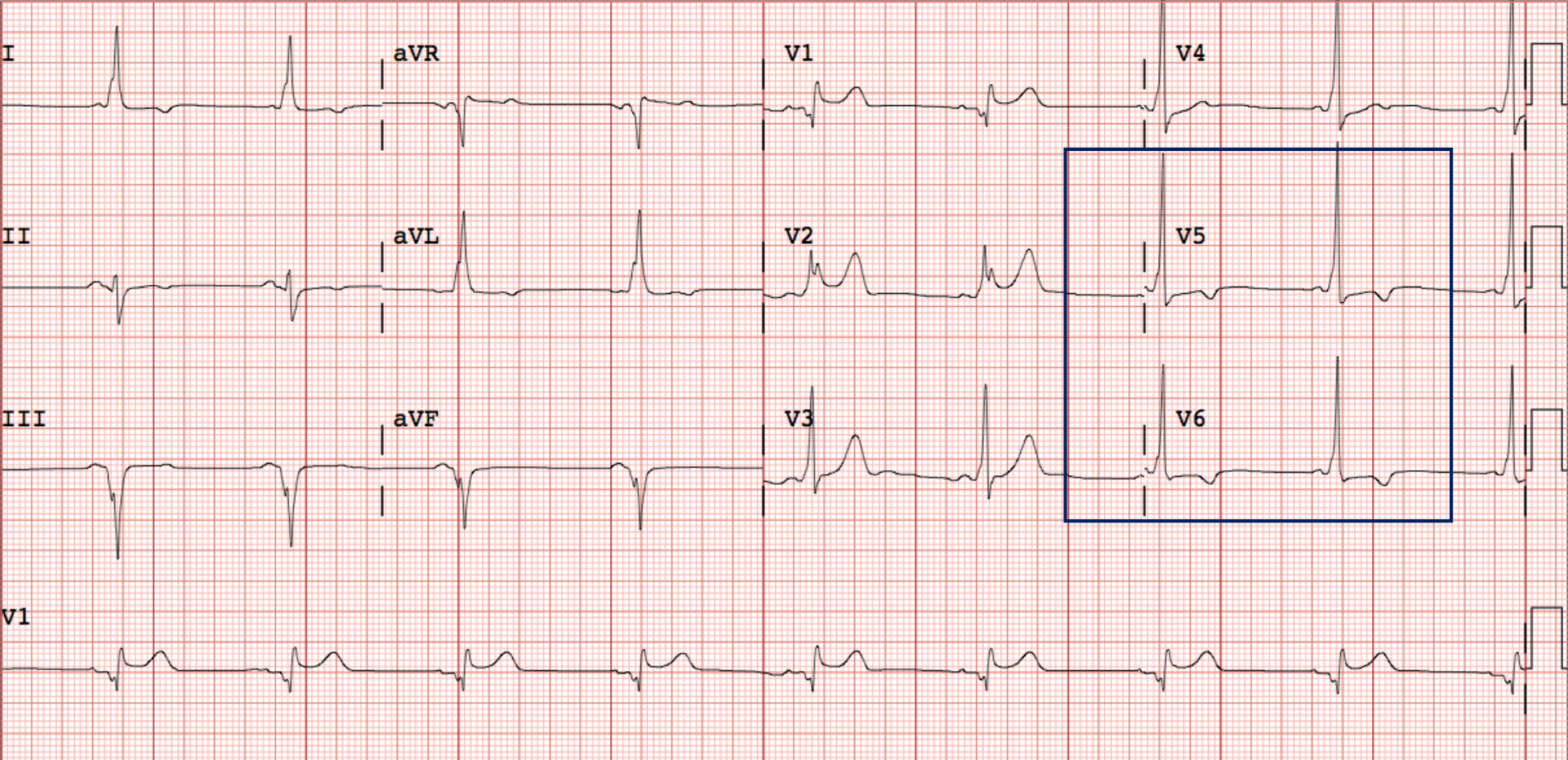




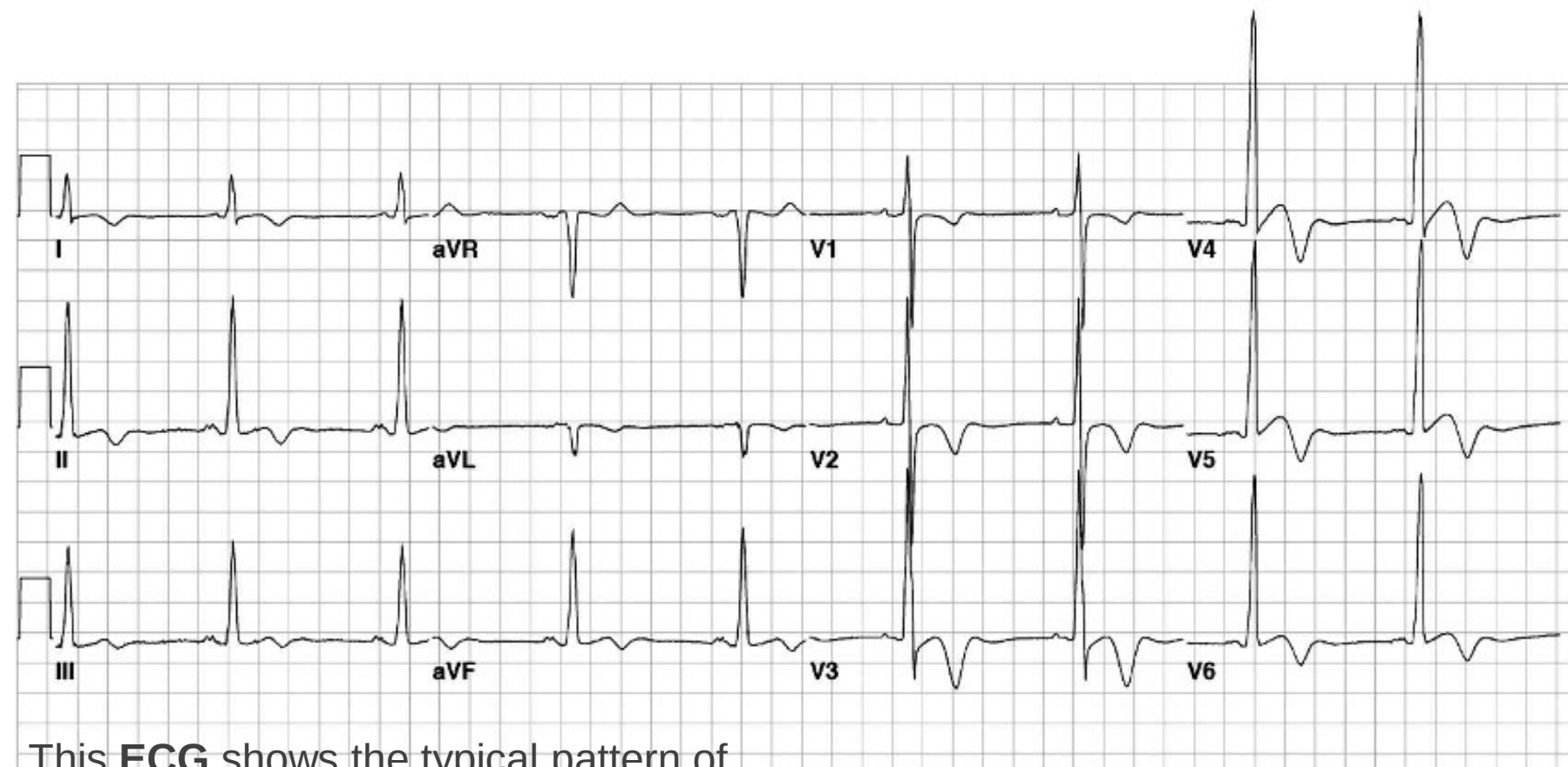
normal



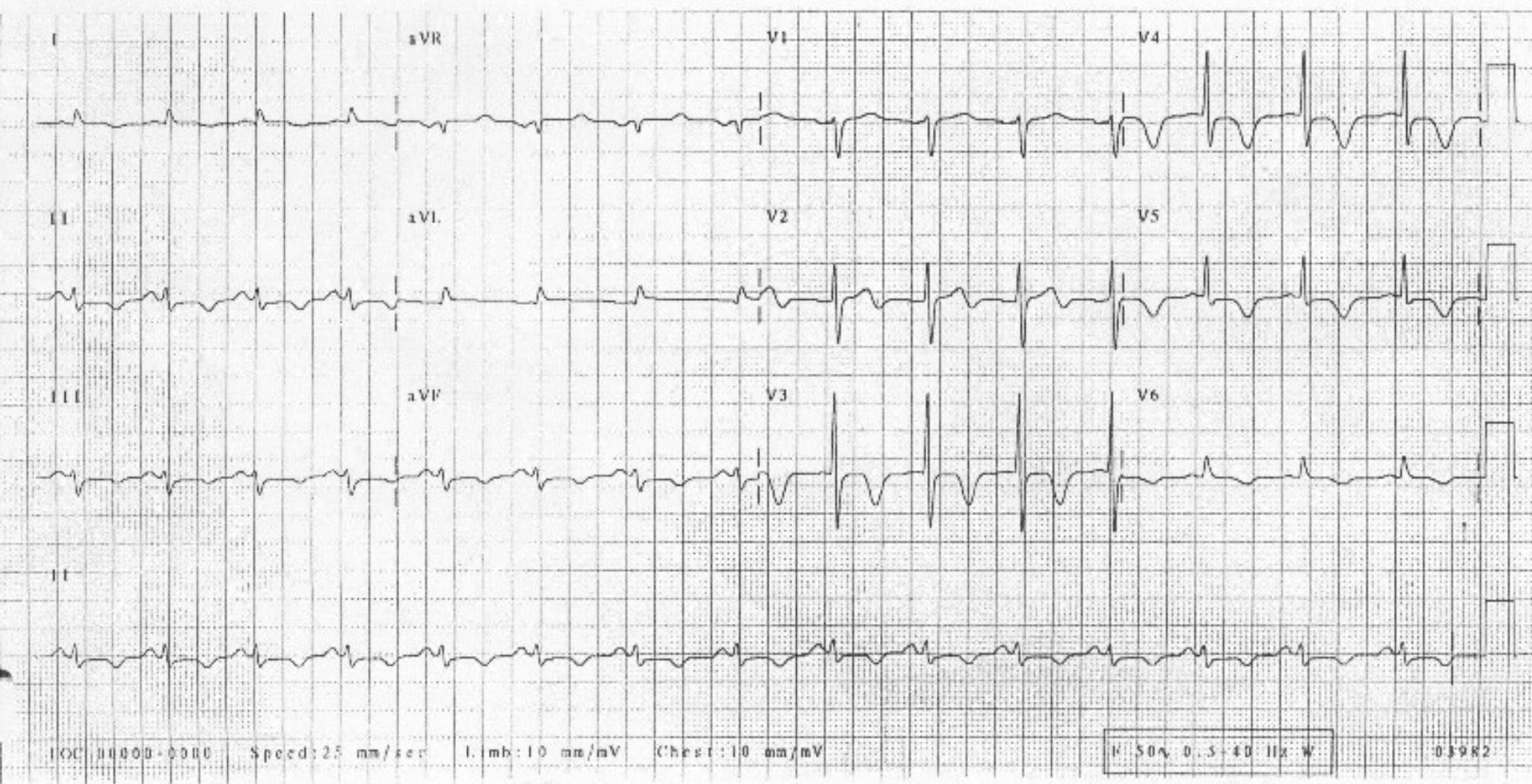
Inverted due to Myocardial Ischemia



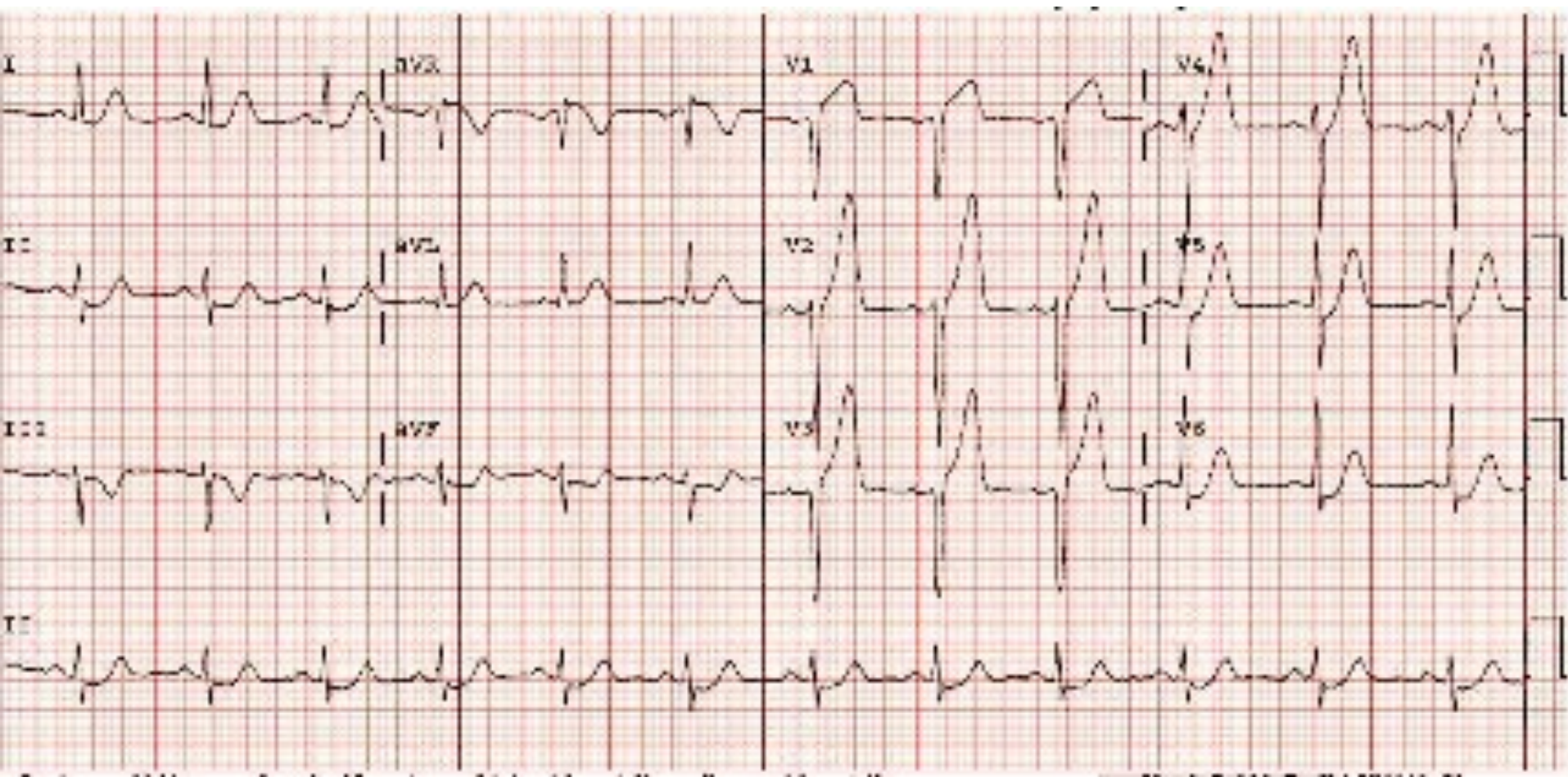
Inverted due to Myocardial Ischemia



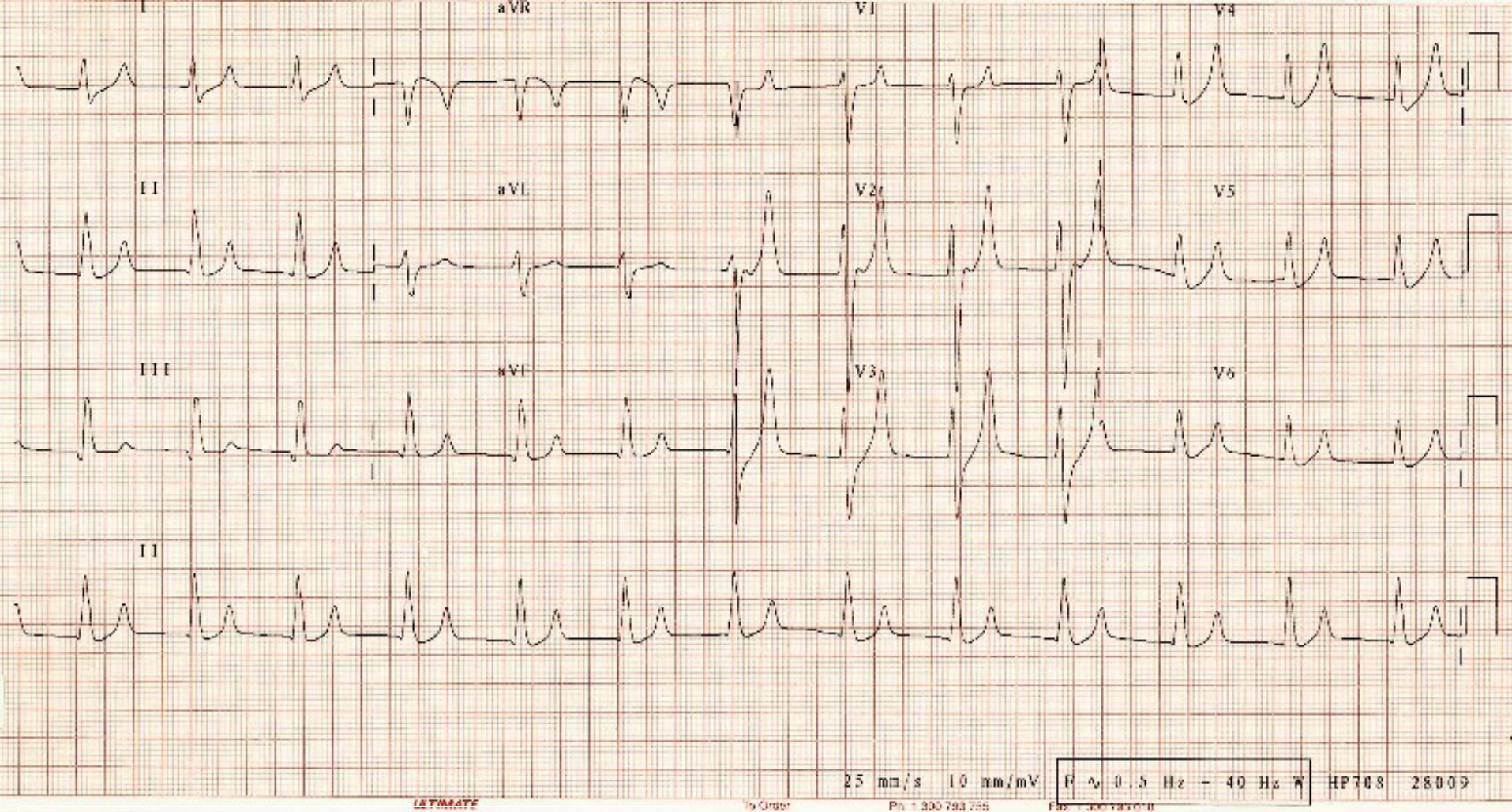
This **ECG** shows the typical pattern of apical HCM



This **ECG** in Subarachnoid hemorrhage showing wide spread T wave inversions



Tall Peaked T Waves in Hyperkalemia



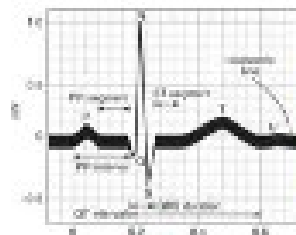
Tall Peaked T Waves in Hyperkalemia



Normal

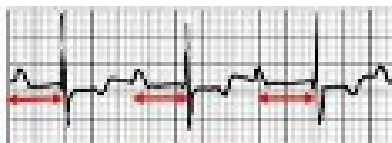
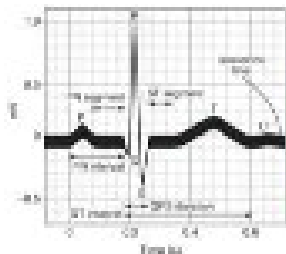
PR Interval





PR Interval

- 1- Indication of atrioventricular conduction time
- 2- Measured from the beginning of P wave to the beginning of R wave
- 3- Normally it measures 3-5 small squares
- 4- Observing the PR interval helps in the diagnosis of many cases of heart block

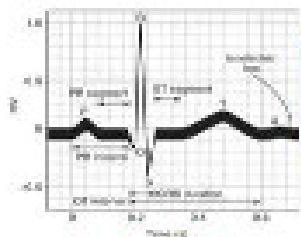


Prolonged PR intervals in first degree heart block



First degree heart block

Long PR intervals

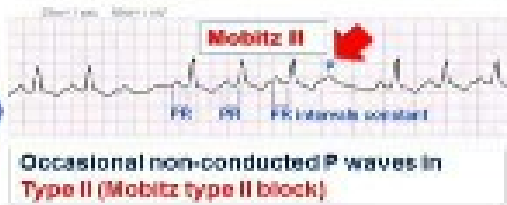
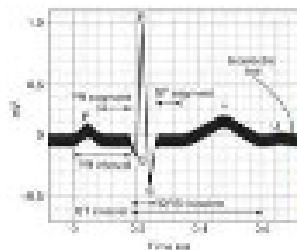


Gradual prolongation of PR intervals followed by non conducted P wave (Dropped beat) in **Wenckebach phenomenon**

Second degree heart block

Type I (Mobitz type I block or Wenckebach phenomenon)

Gradual prolongation of PR intervals followed by non conducted P wave (Dropped beat)

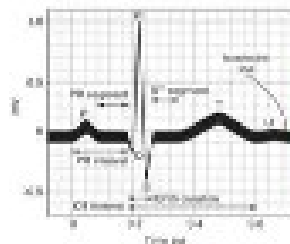


Second degree heart block

Type II (Mobitz type II block)

Occasional non-conducted P waves

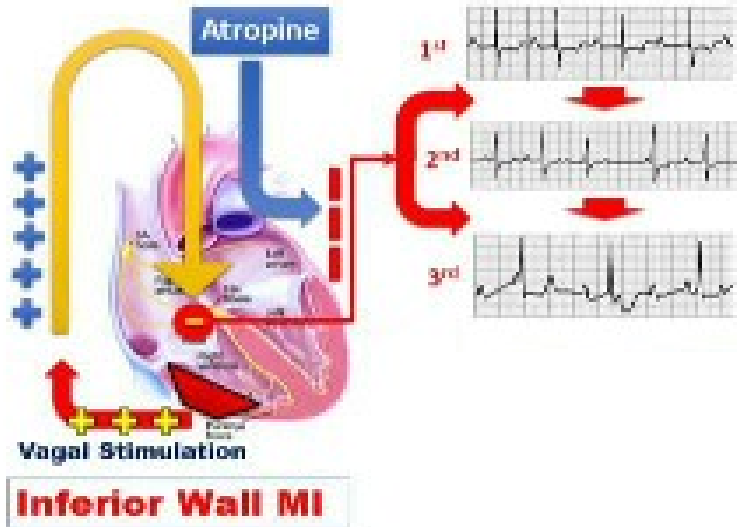
- Almost always pathological
- Occurs in AMI
- May herald the onset of CHB



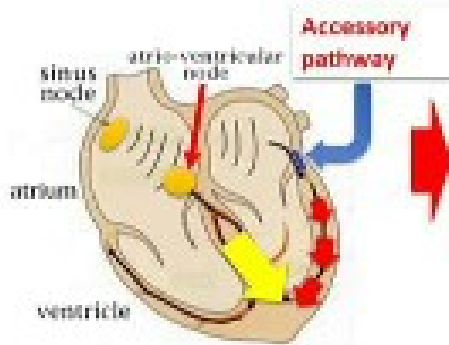
P-P intervals are different from R-R intervals.

Complete Heart Block **CHB**

Complete atrio-ventricular dissociation as the ventricle follows IVR while atrial activity follows an atrial focus.



Wolff-Parkinson-White Syndrome WPWS



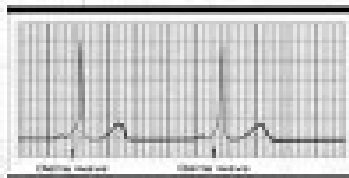
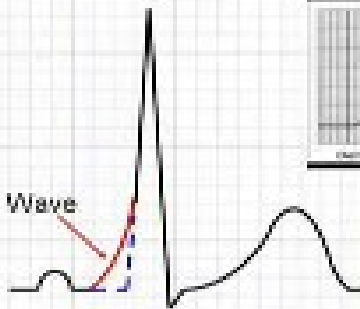
WPWS is associated with short PR interval and slurred initial segment of the QRS.

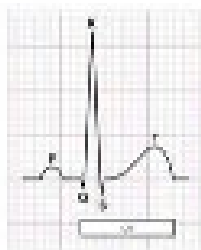


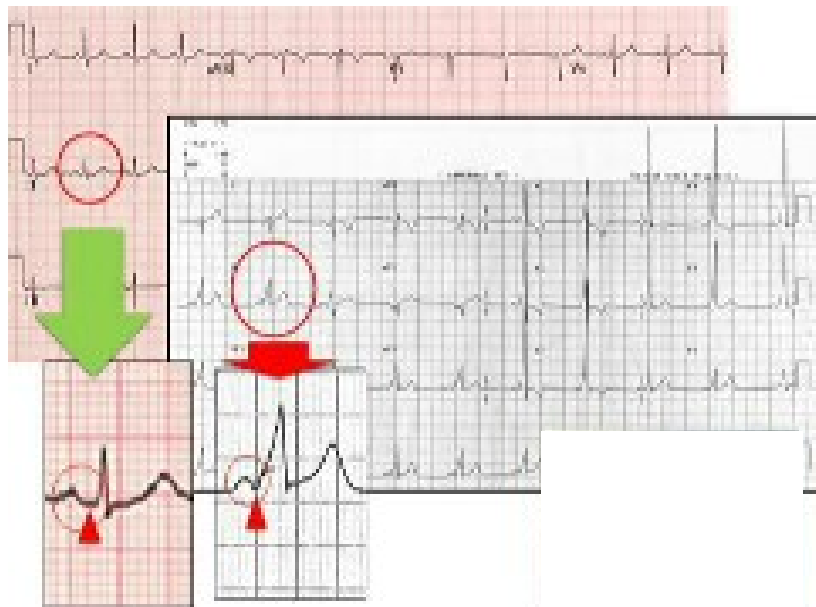
Delta Wave

Wolff-Parkinson-White Syndrome

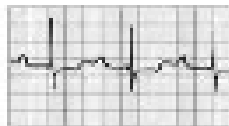
Delta Wave





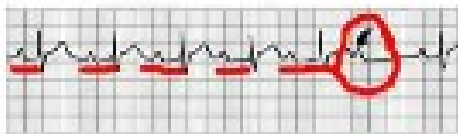


PR Interval



**Long PR interval in first
degree heart block**

PR Interval

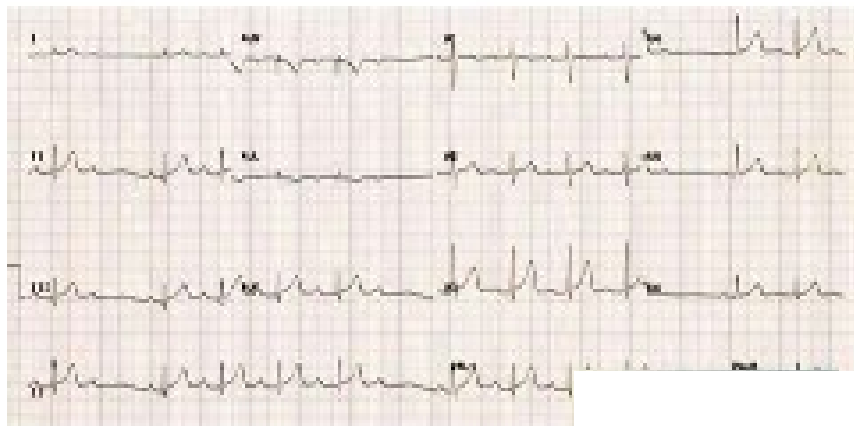


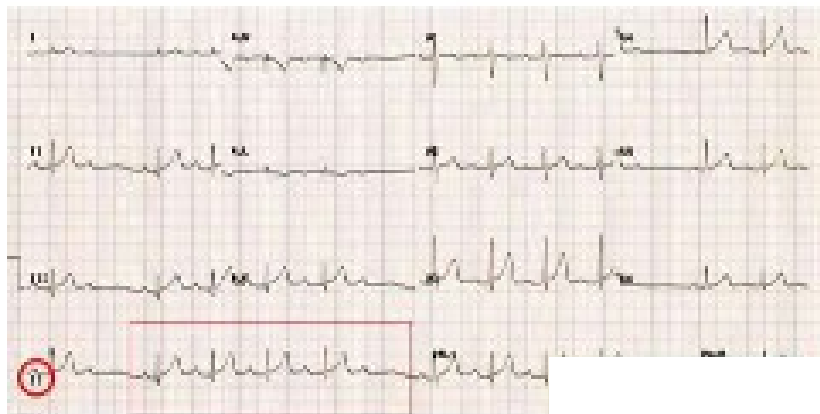
**Gradual prolongation of PR
Interval in Wenckbach
phenomenon**

PR Interval



Occasional non-conducted P waves in
Type II (Mobitz type II block)







Wenckbach phenomenon



Type II (Mobitz type II block)



ST-Segment

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

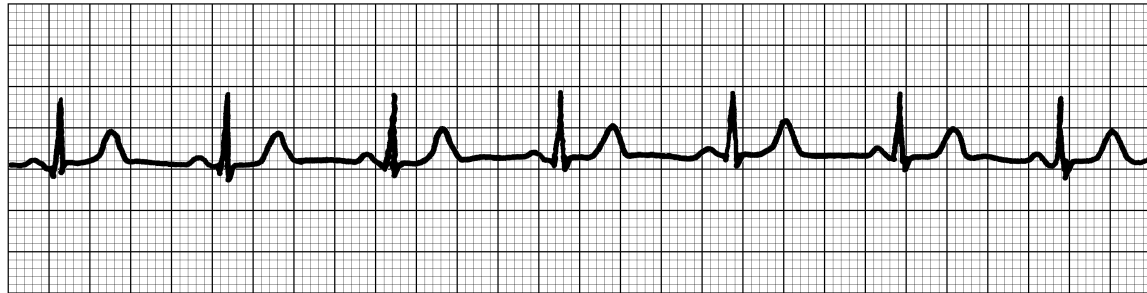
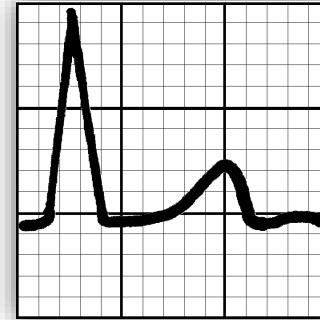
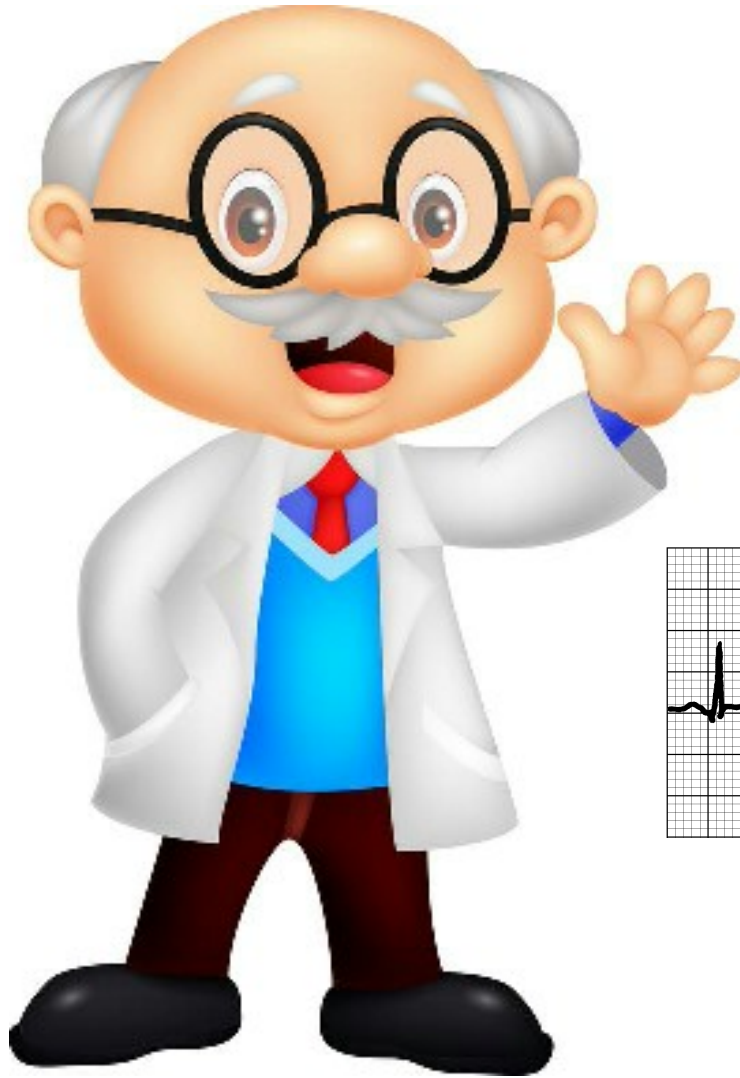
هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في هذا الموقع هم
تحت حماية قانون الملكية الفكرية و لا يحق لأحد إستخدامه أو إستنساخه أو
تحميله على أى كمبيوتر أو إعادة طبعه أو طبع أجزاء منه بدون إذن مسبق من
الدكتور طارق عبد الحميد (أو من ينوب عنه قانونياً) . و من يتعدى على
الملكية الفكرية المذكورة فسوف يتعرض للمسائلة القضائية عن جريمة إنتهاك
حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول
فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص برجاء
الإتصال بالدكتور طارق عبد الحميد



ST Segment



① In normal heart the ST segment is **Isoelectric** i.e. on the base line

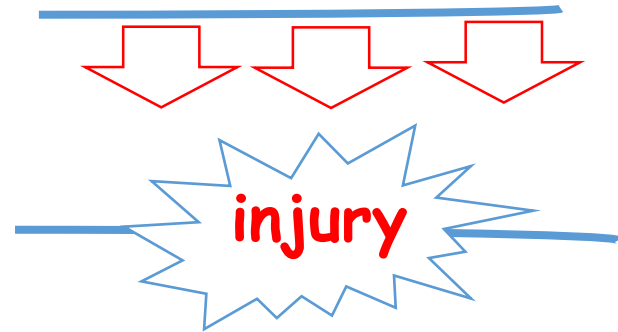


② If the myocardium is injured due to ischemia, infarction, or inflammation the **Resting Membrane Potential** (RMP) of the injured area will differ from the uninjured part.





③ The difference in RMP between the injured and uninjured area creates electrical current between them. This “**Current of injury**” is directed away from the normal myocardium toward the injured area



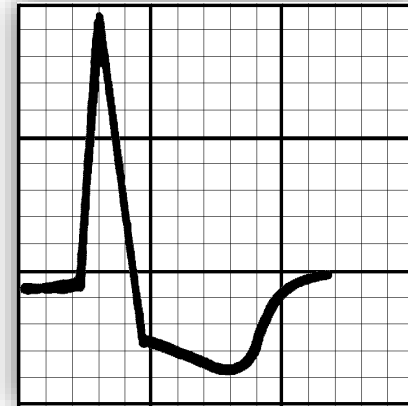
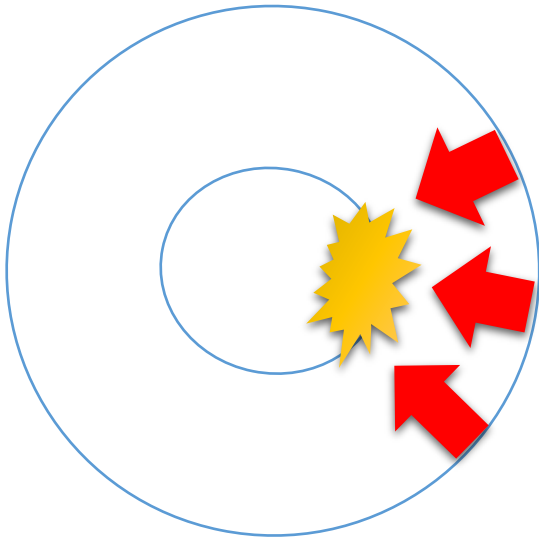


③ The difference in RMP between the injured and uninjured area creates electrical current between them. This “**Current of injury**” is directed away from the normal myocardium toward the injured area



The effect of Myocardial injury on the ST segment

Subendocardial injuries

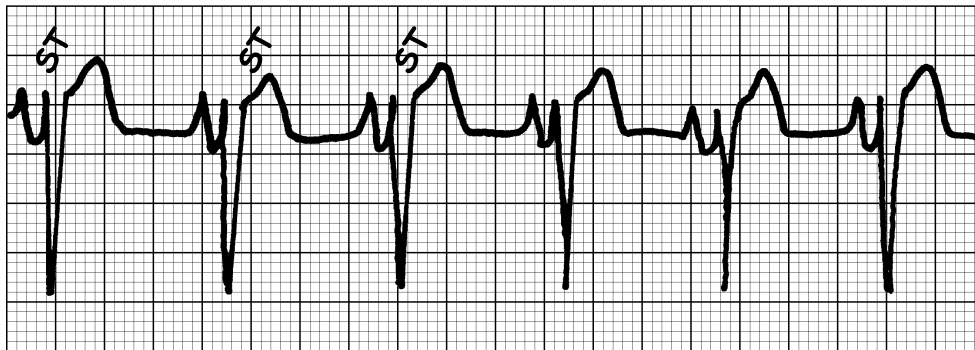
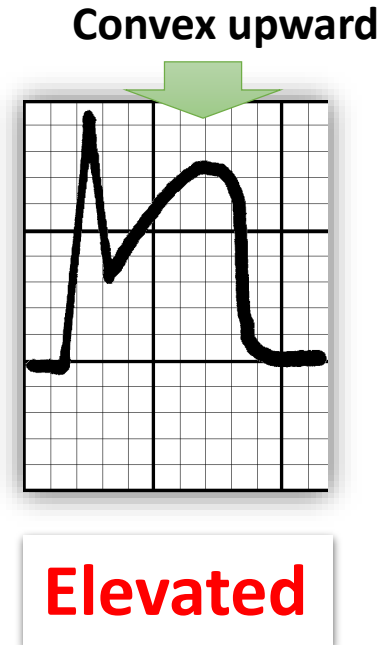
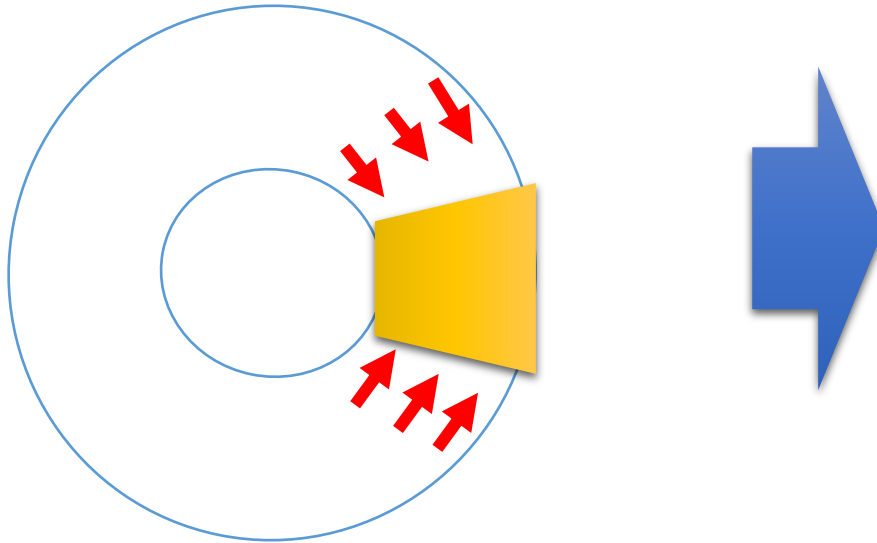


Depressed



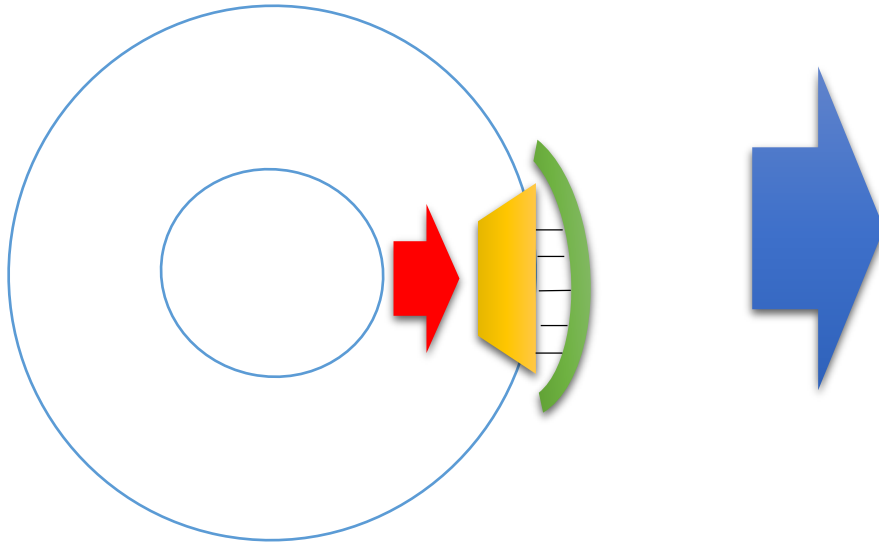
The effect of Myocardial injury on the ST segment

Transmural injuries

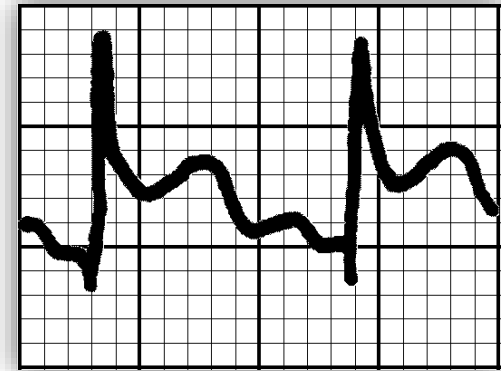


The effect of Myocardial injury on the ST segment

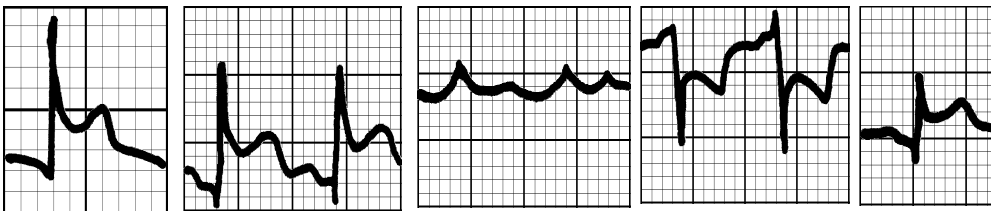
In acute Pericarditis



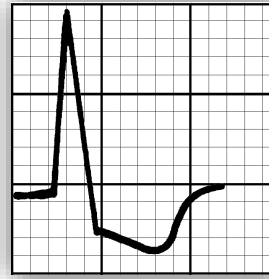
Concave upward



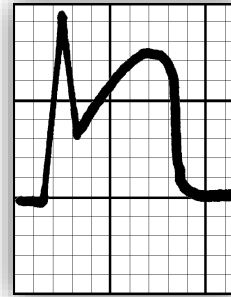
Elevated



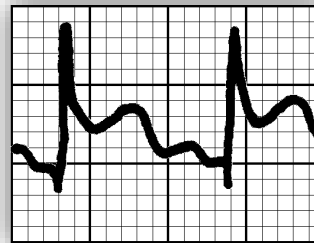
**Subendocardial
injuries**



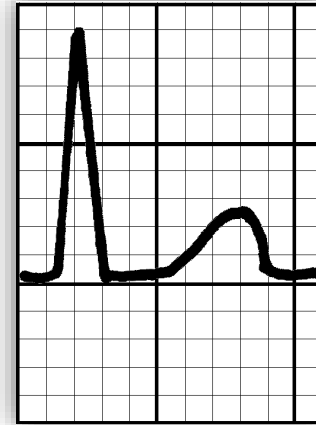
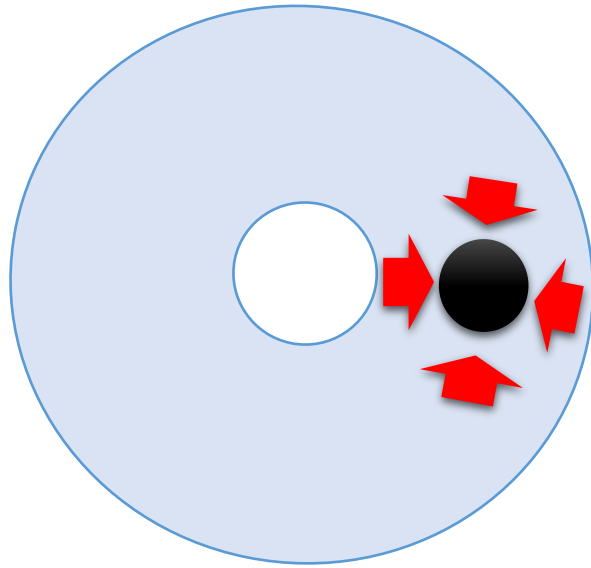
**Transmural
injuries**



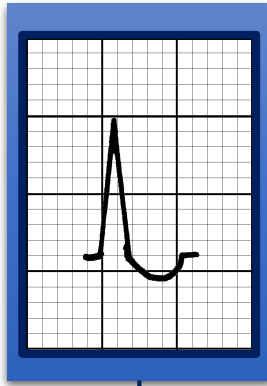
**In acute
Pericarditis**



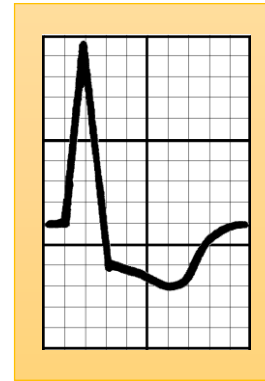
① Electrically Silent Infarction



② Digitalis Effect



**Scooping of the ST
segment**



Ischemia

3 Early repolarization variant

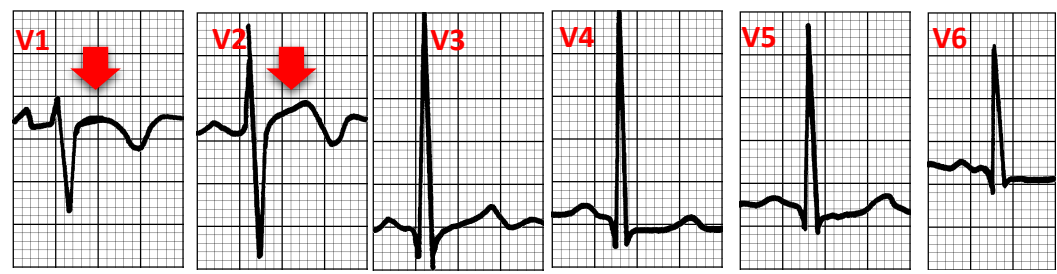
A normal Variant especially in young black men.



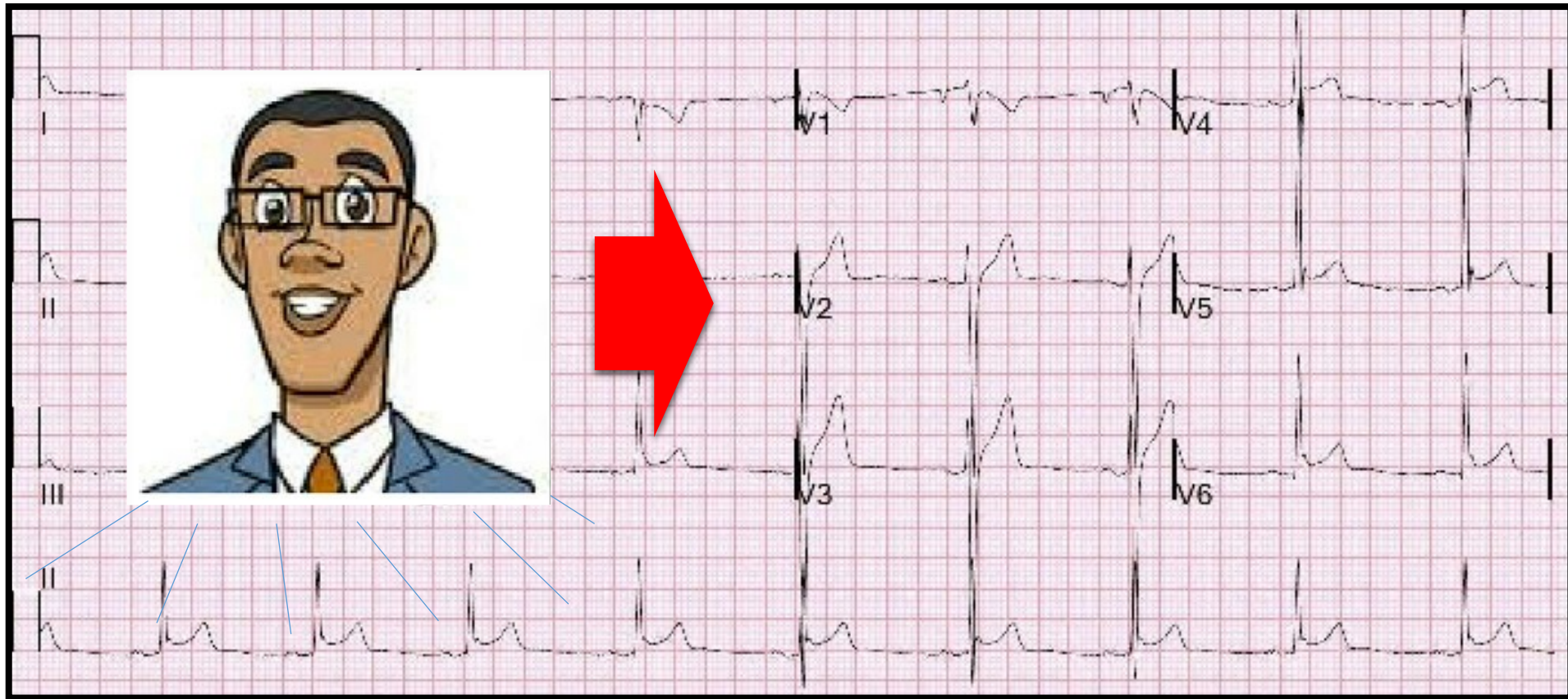
V1

V2

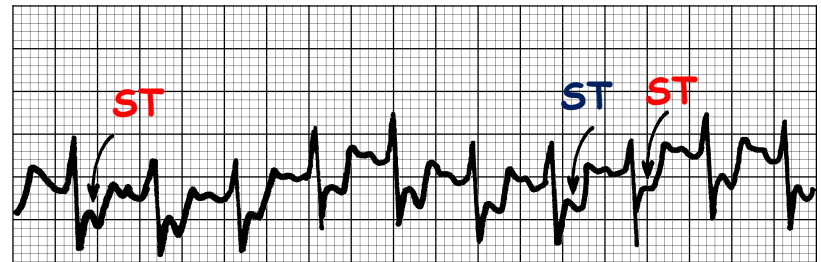
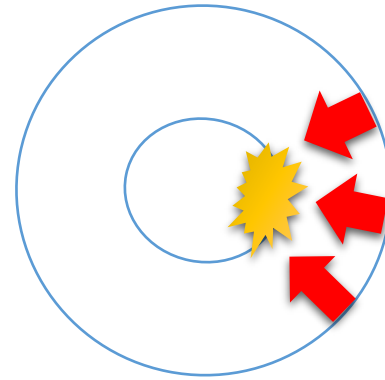
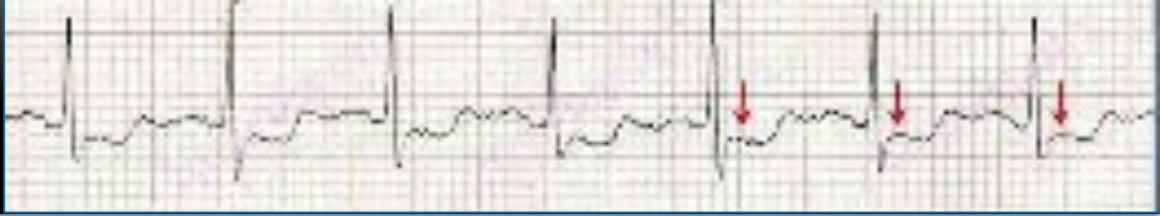
V3



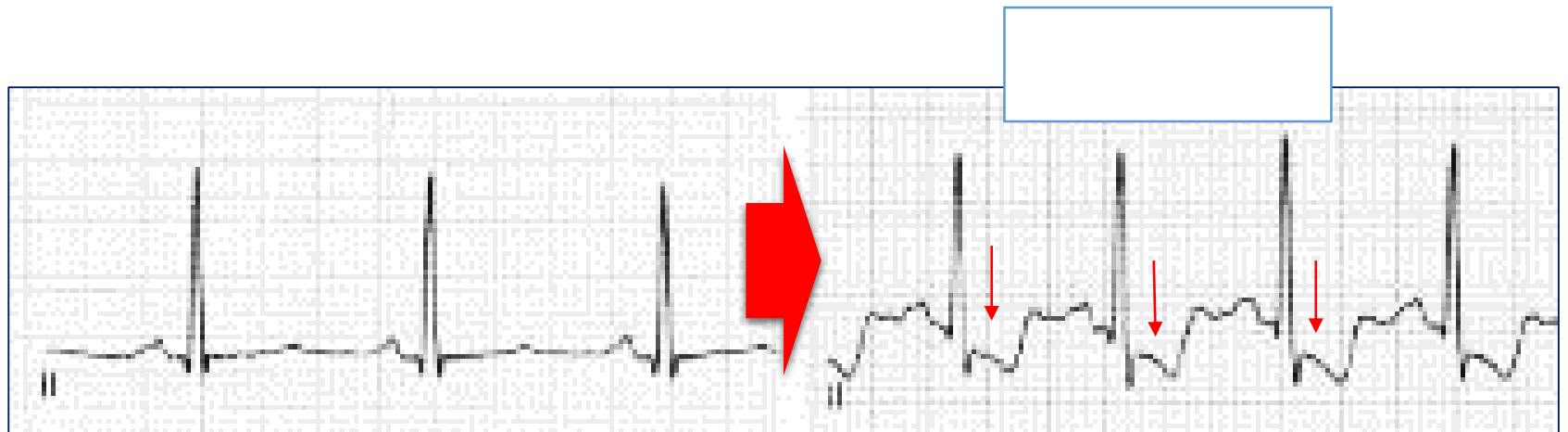
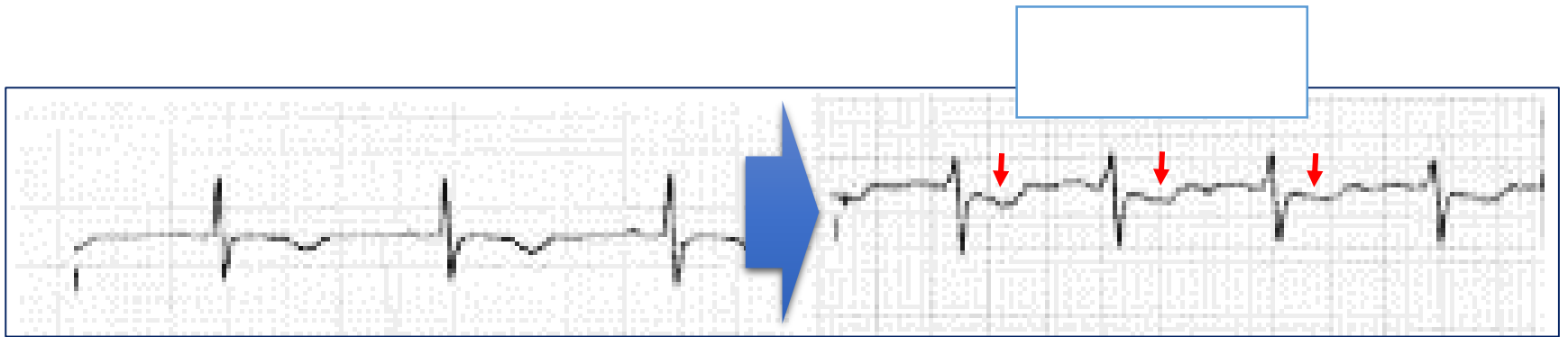
Early repolarization variant



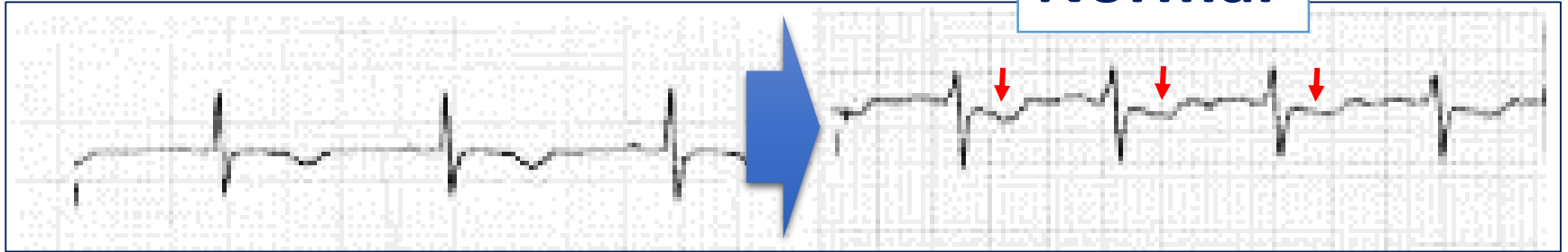
ETT



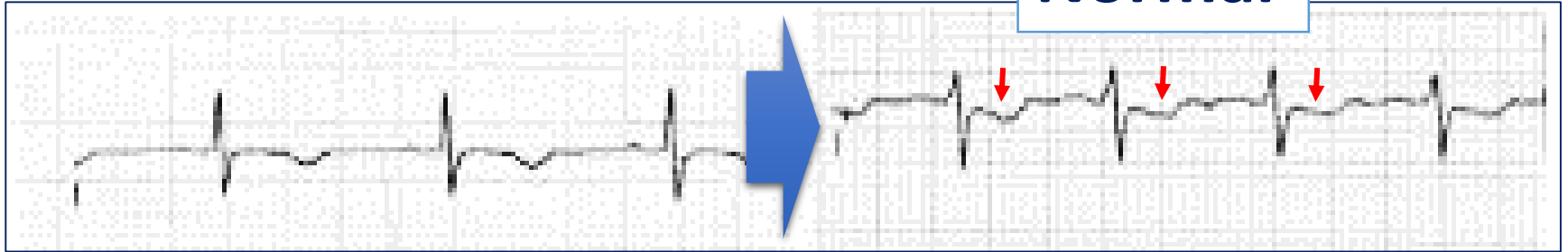
Depression of the ST segment of more than **2 small squares** is significant.



Normal



Normal



Ischemia



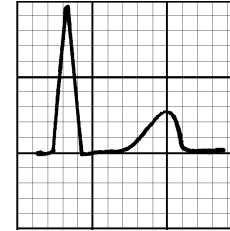


Ischemia

**Let us Revise
the ST
Segment**



ST Segment

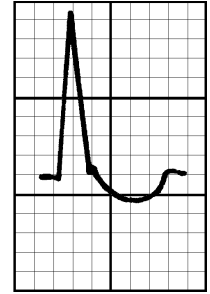


**Normal ST
segment**

ST Segment



Ischemia



Digitalis effect

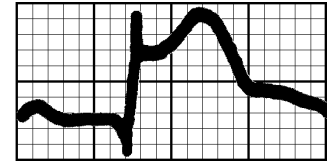


**Depressed ST
segment**

ST Segment



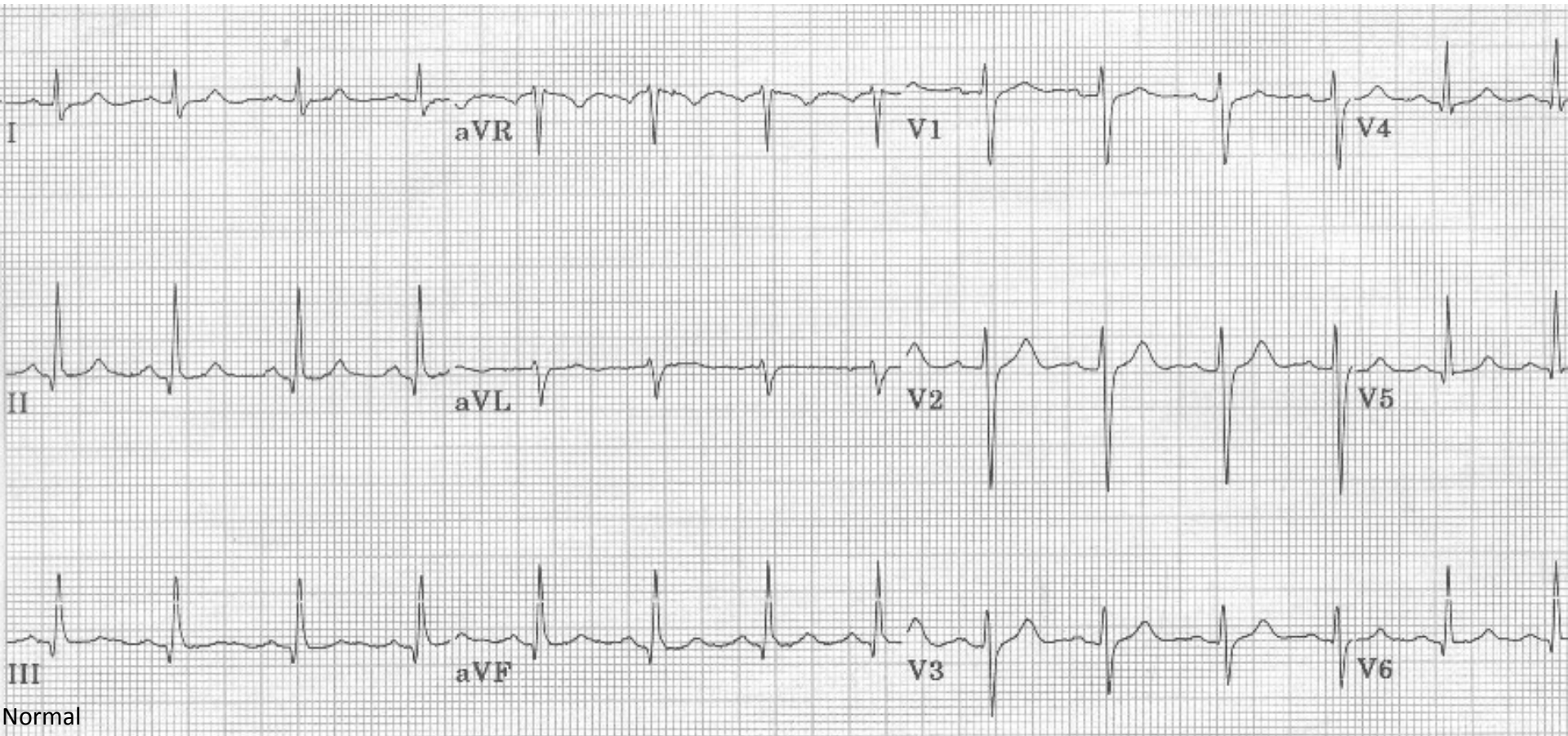
AMI

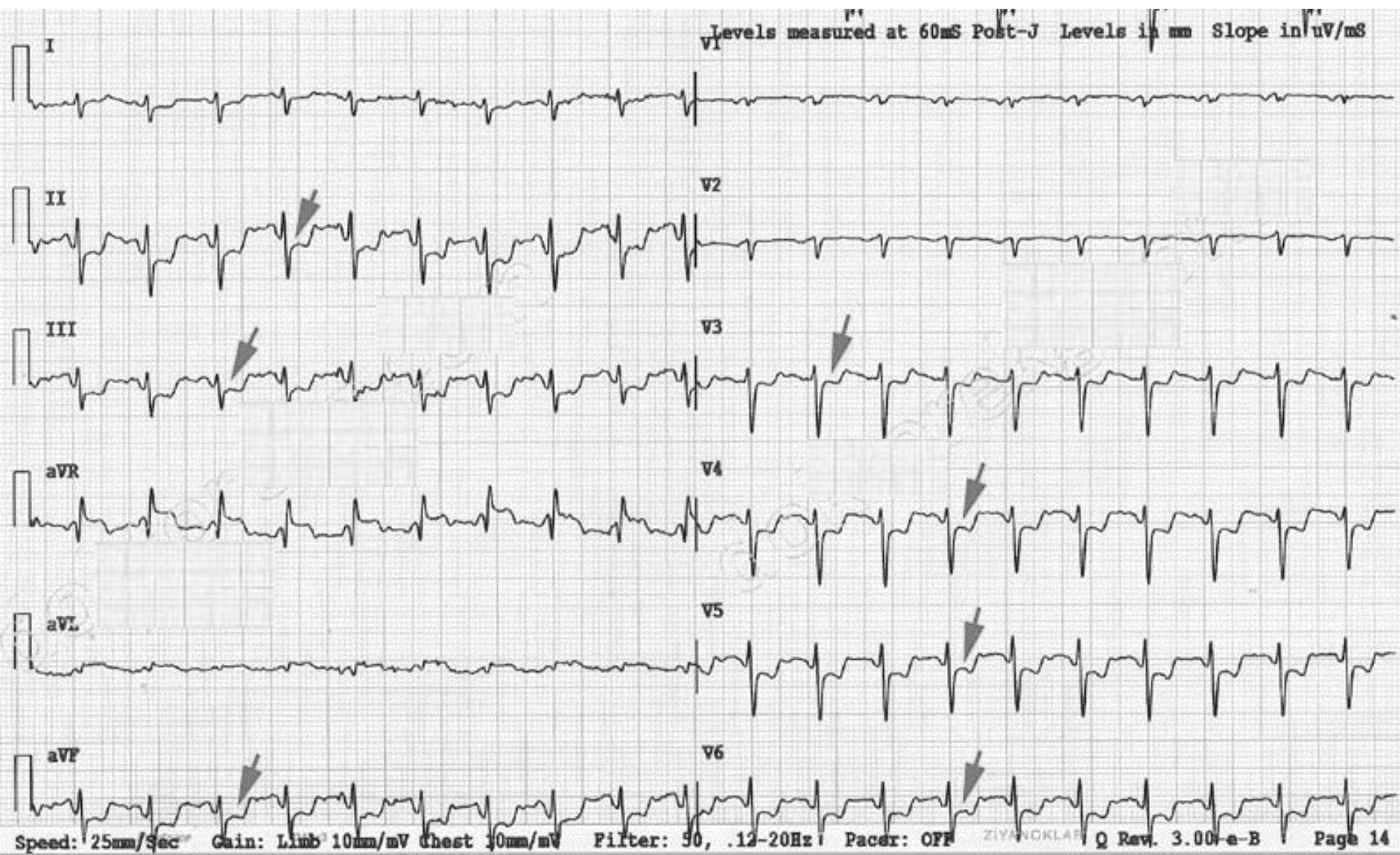


Pericarditis

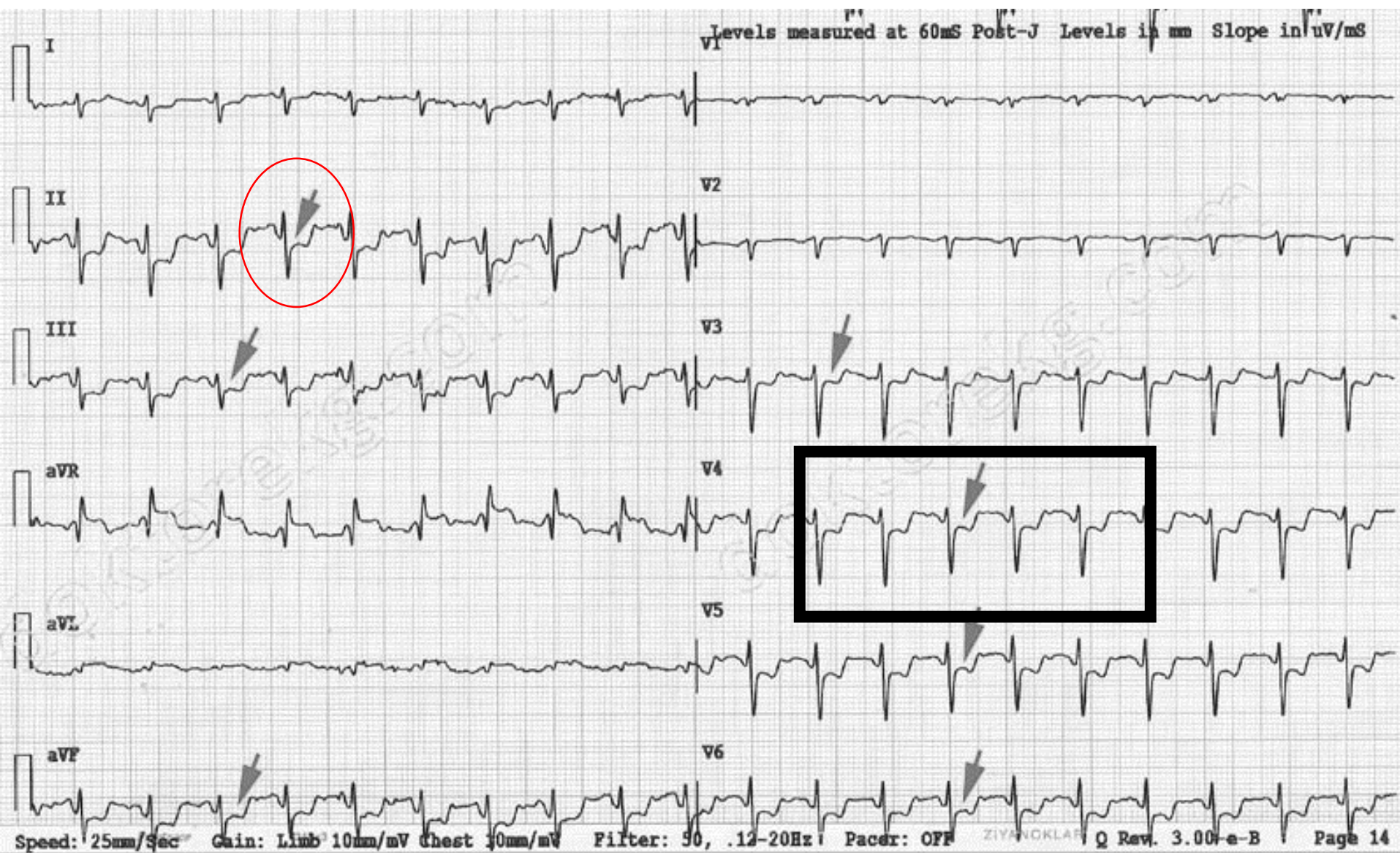


**Elevated ST
segment**

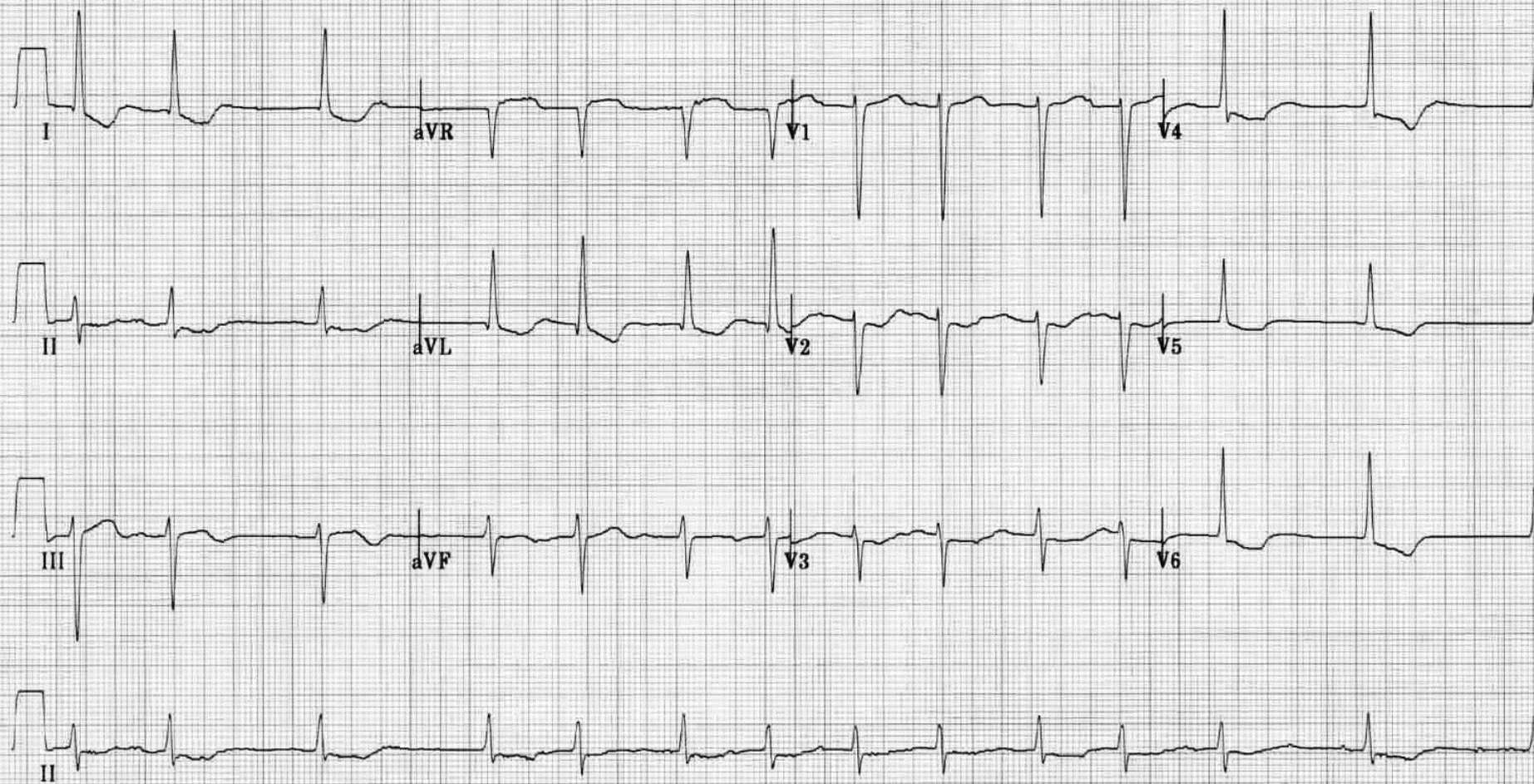




Depressed ST



Angina: depressed ST



Sagging of ST Digitalis effect

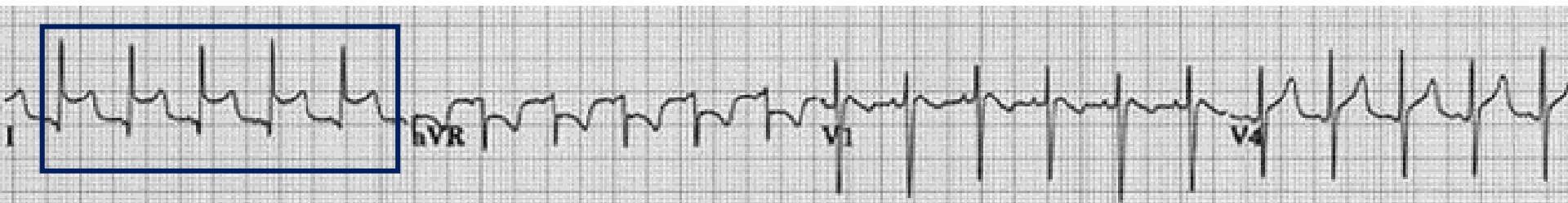
AMI



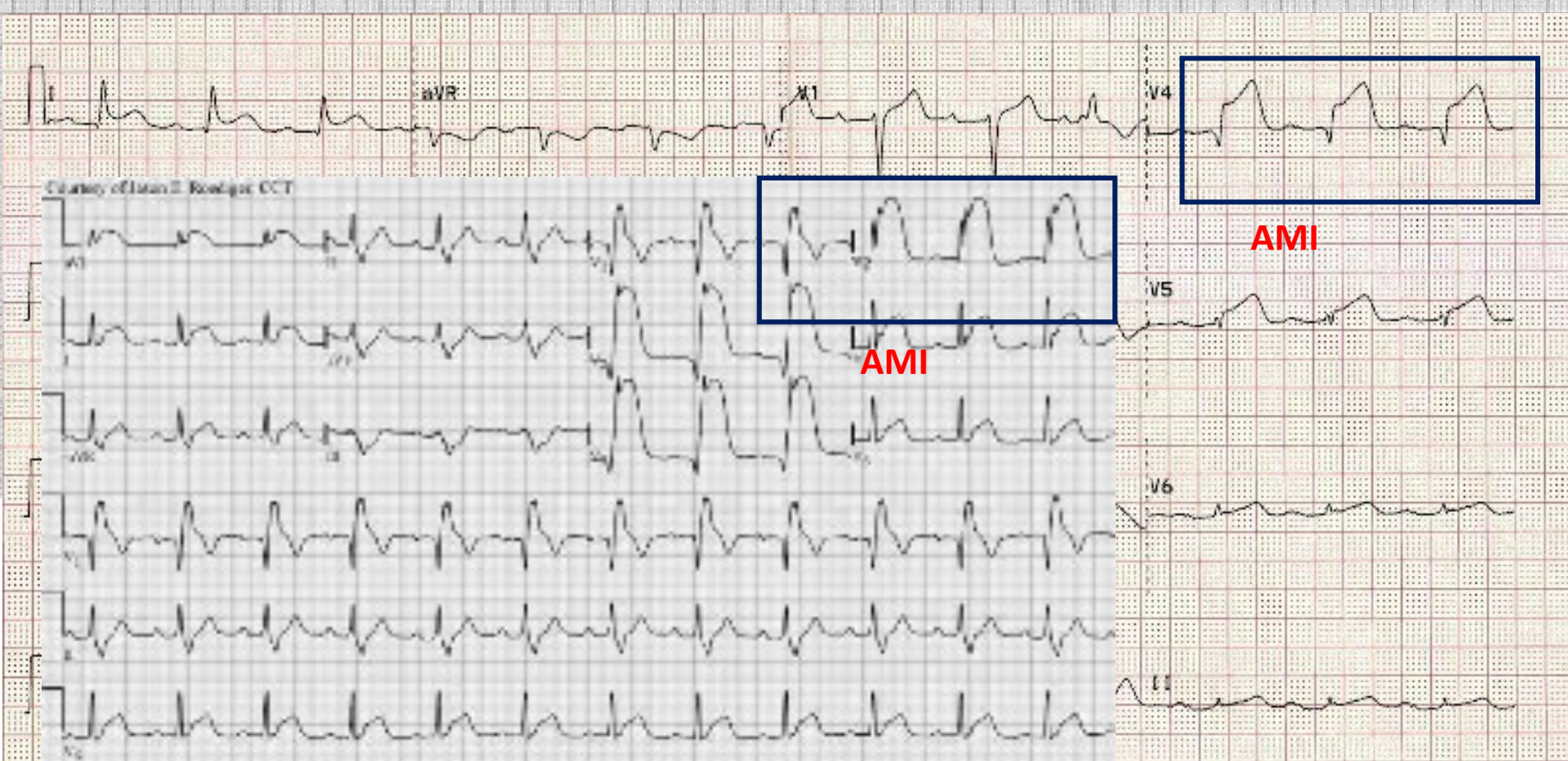
AMI ELEVATED ST

Charting of Juan B. Rodriguez OCT





Pericarditis

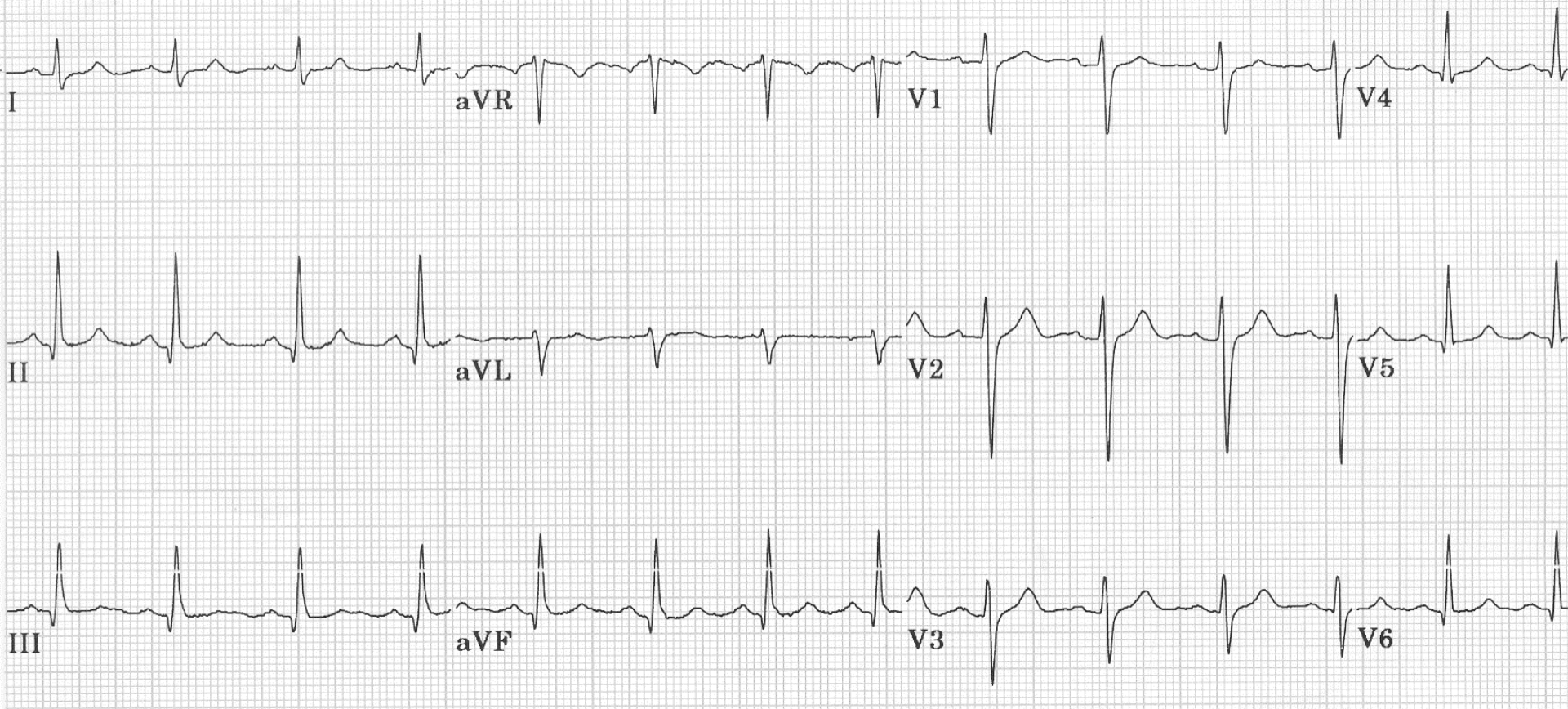


Test Yourself

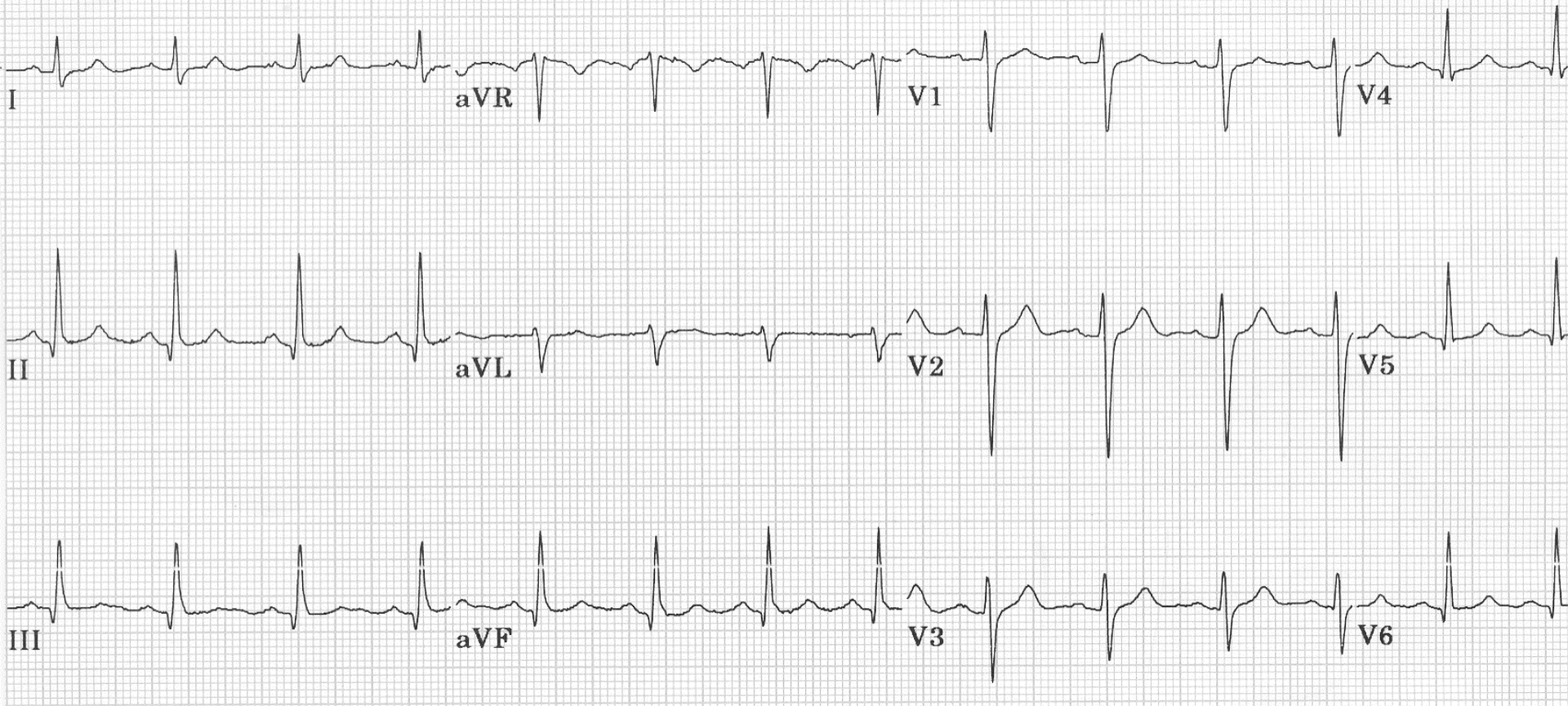


Comment on the ST Segment

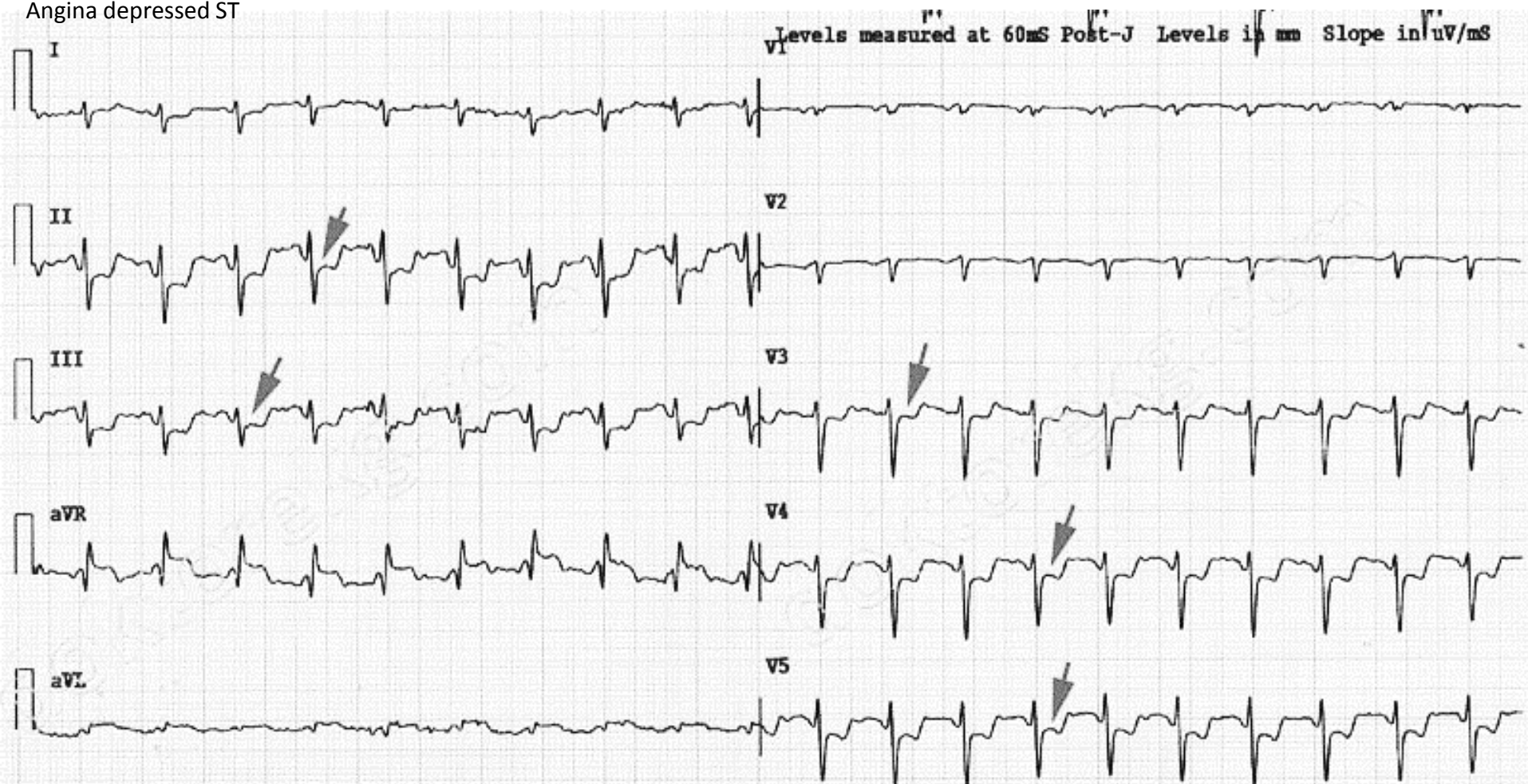




- ① Normal ST segment
- ② Angina
- ③ Digitalis effect
- ④ AMI
- ⑤ Pericarditis

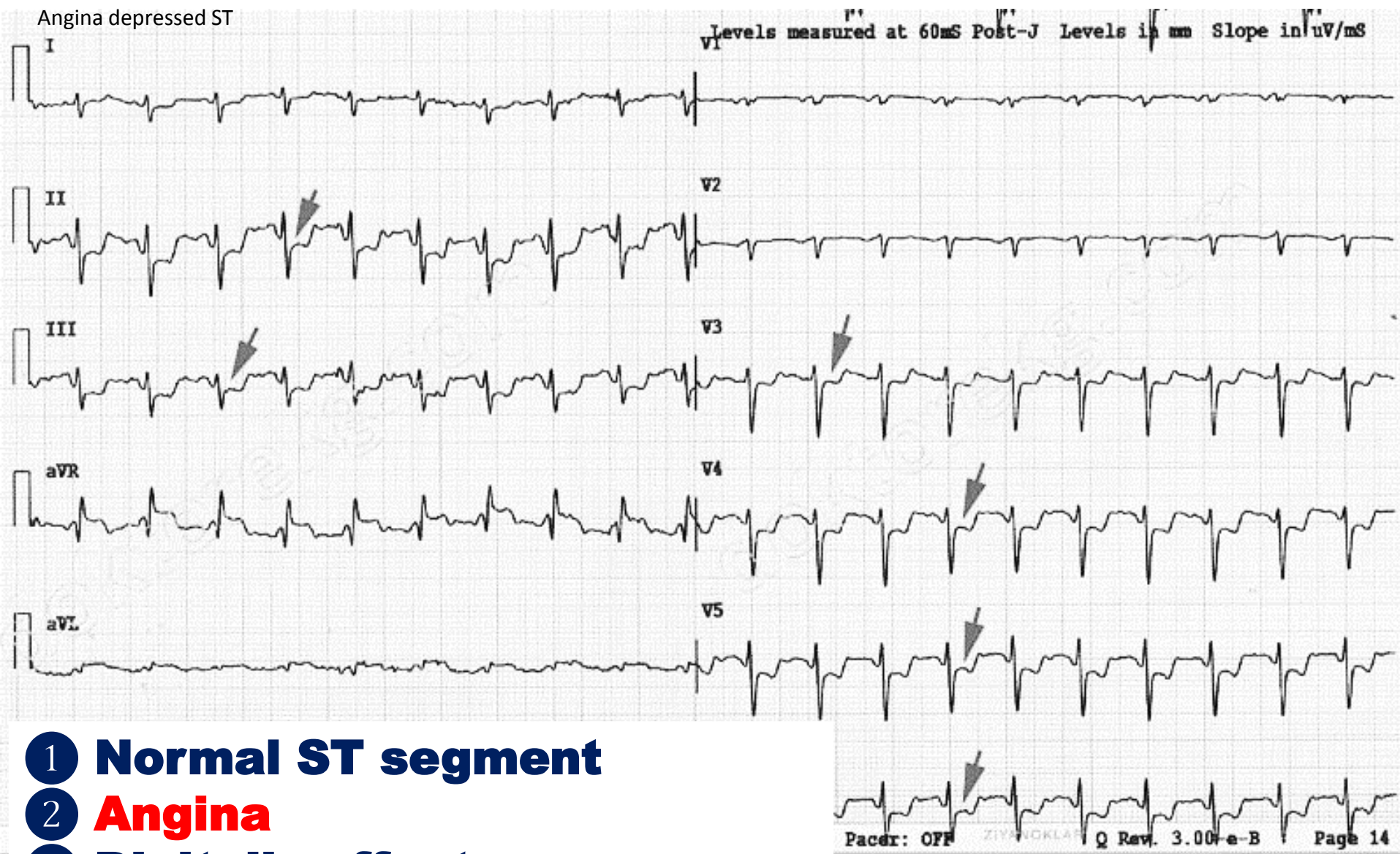


- 1 **Normal ST segment**
- 2 **Angina**
- 3 **Digitalis effect**
- 4 **AMI**
- 5 **Pericarditis**

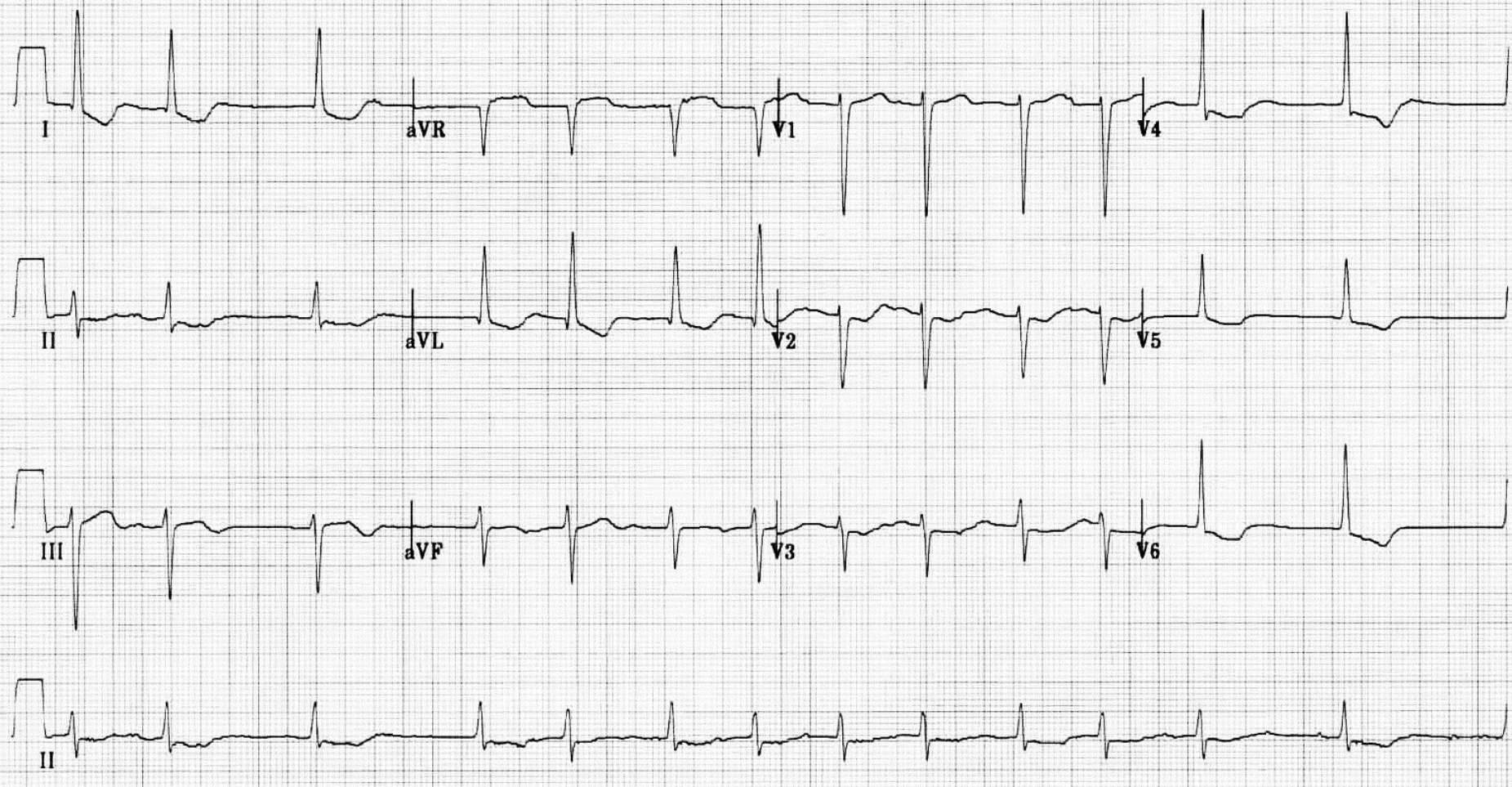


- ① Normal ST segment
- ② Angina
- ③ Digitalis effect
- ④ AMI
- ⑤ Pericarditis

Angina depressed ST



Sagging of ST Digitalis effect



① Normal ST segment

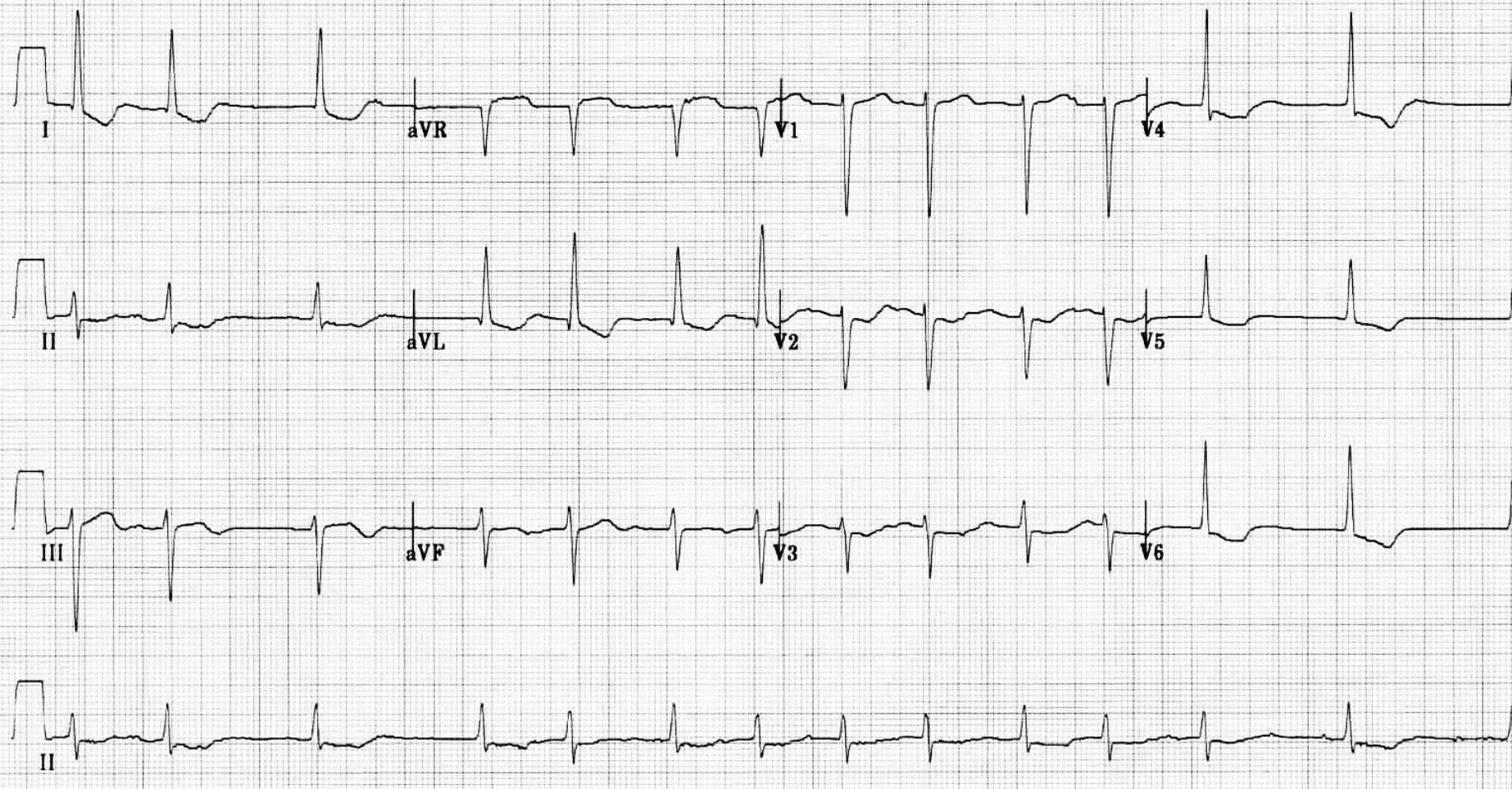
② Angina

③ Digitalis effect

④ AMI

⑤ Pericarditis

Sagging of ST Digitalis effect



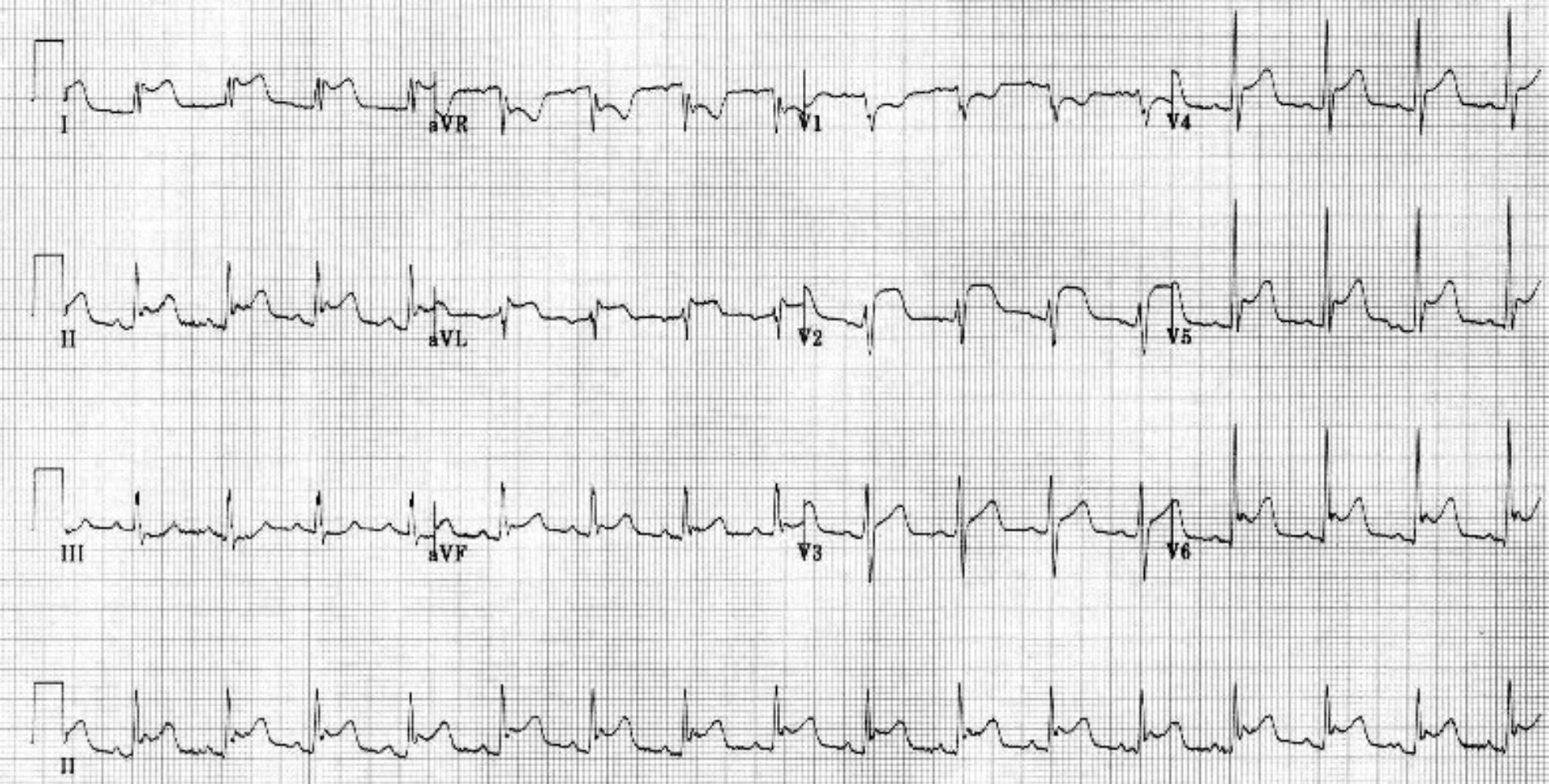
- ① Normal ST segment
- ② Angina
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- ① Normal ST segment
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- ③ Digitalis effect
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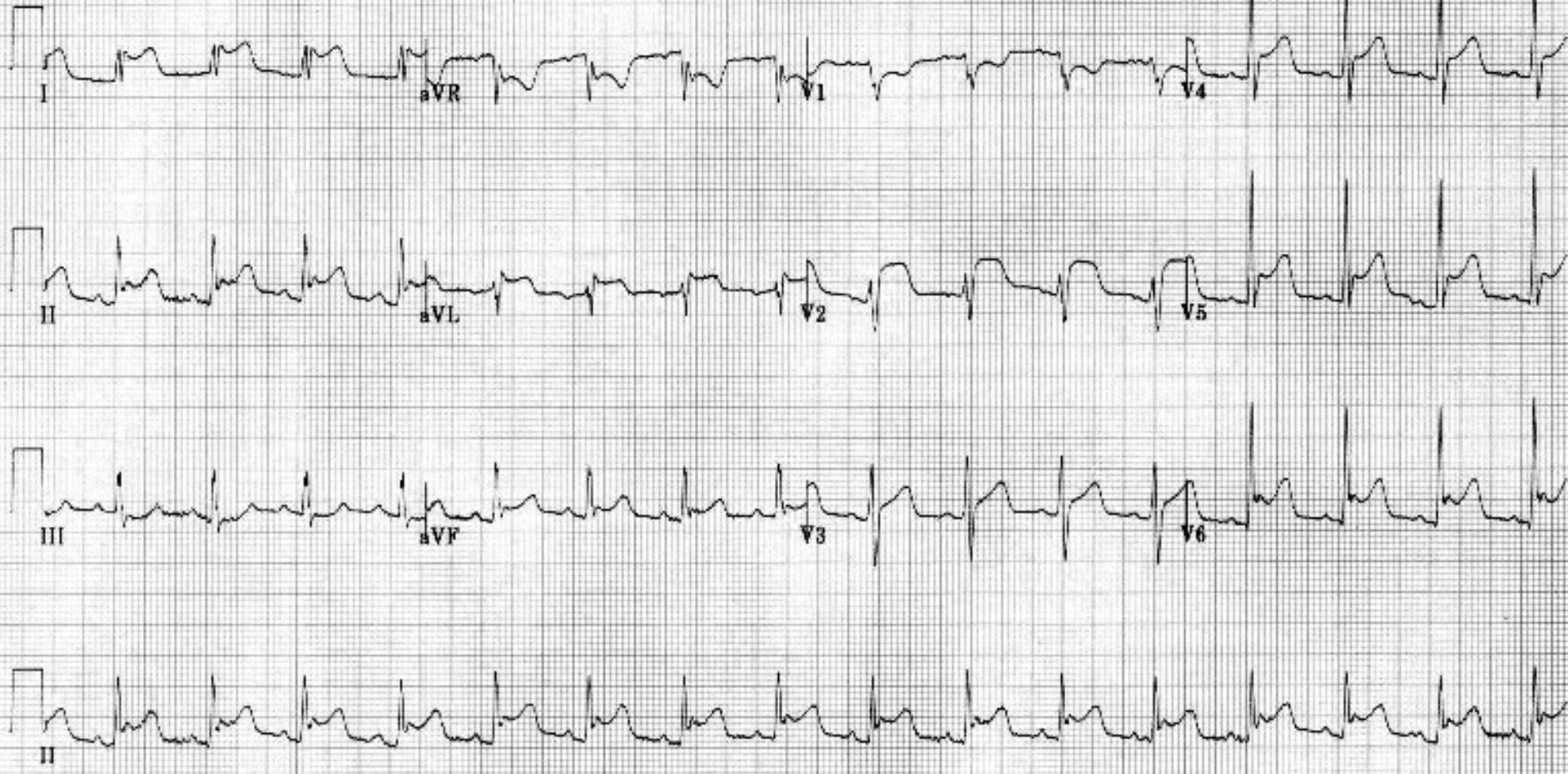


- ① Normal ST segment
- ② Angina
- ③ Digitalis effect
- ④ **AMI**
- ⑤ Pericarditis



- ① Normal ST segment
- ② Angina
- ③ Digitalis effect
- ④ AMI
- ⑤ Pericarditis

Pericarditis



- 1 Normal ST segment
- 2 Angina
- 3 Digitalis effect
- 4 AMI
- 5 **Pericarditis**

AMI

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

**هذا الكتاب الإلكتروني و جميع الرسوم التوضيحية المتاحة في
هذا الموقع هم تحت حماية قانون الملكية الفكرية**

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الإتصال بالدكتور طارق عبد الحميد



Acute Myocardial Infarction

AMI



The 3 cardinal features of AMI are:-

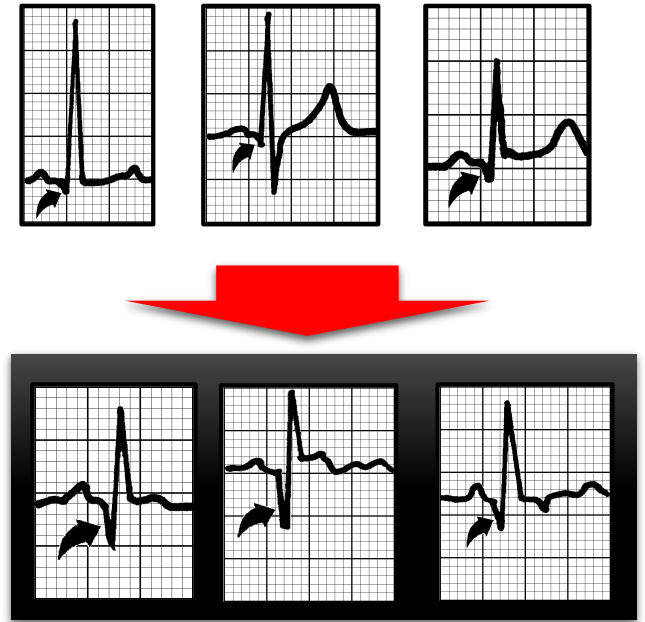
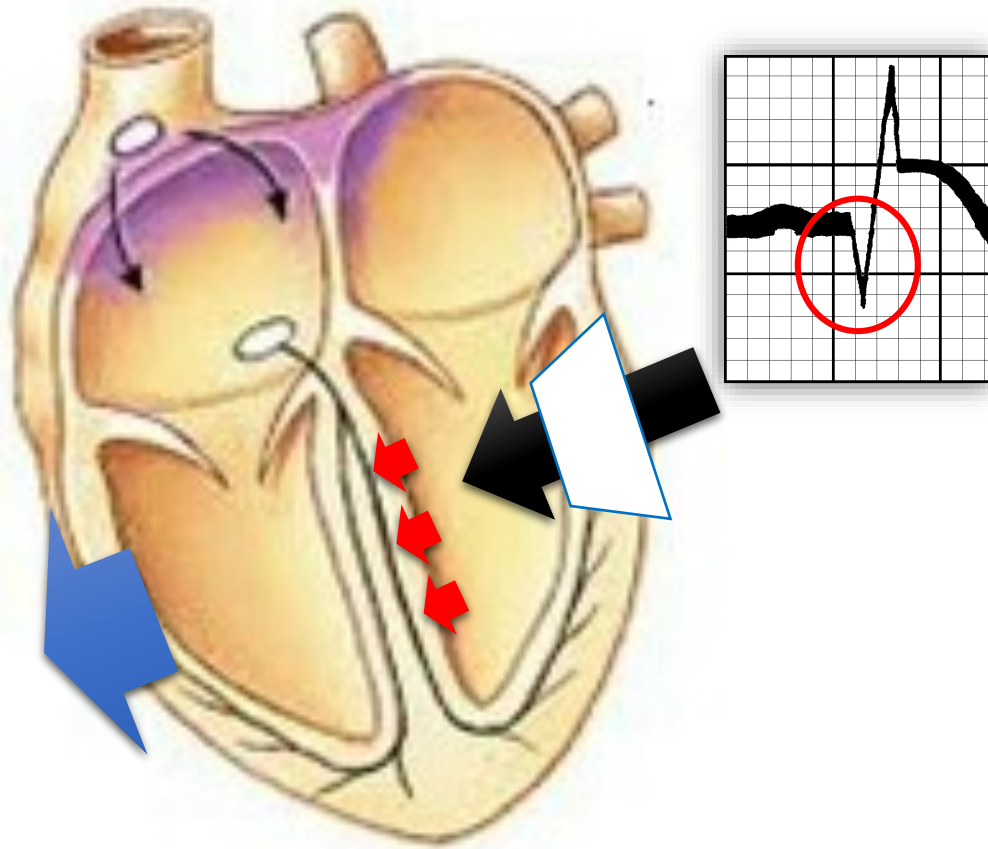




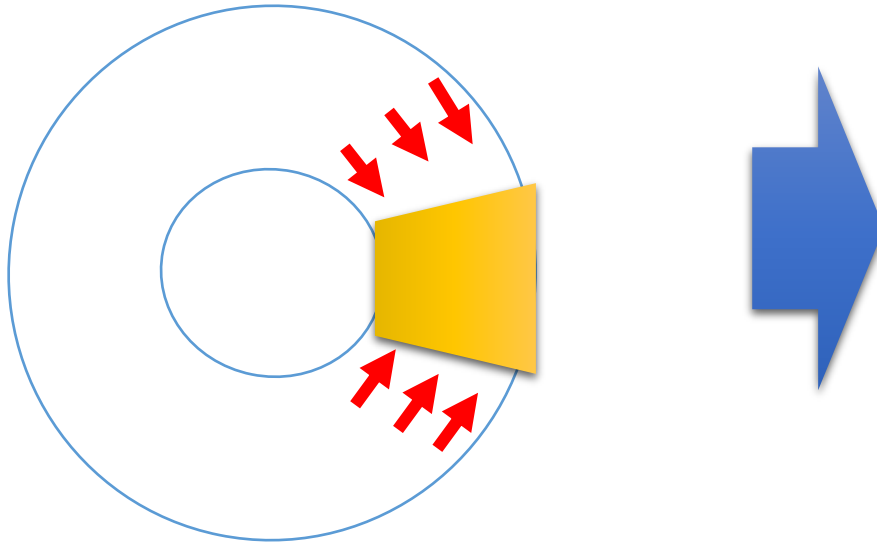
We will discuss the following types of AMI:

- ① Anterior wall MI**
- ② Inferior wall MI**
- ③ Posterior wall MI**
- ④ Non Q wave MI**
- ⑤ Old MI**

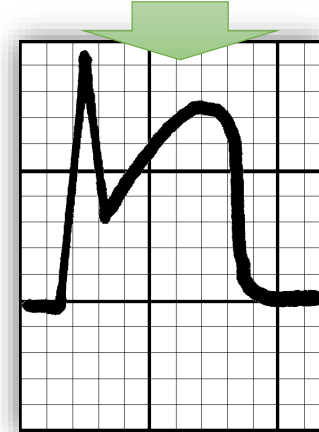
Transmural injuries



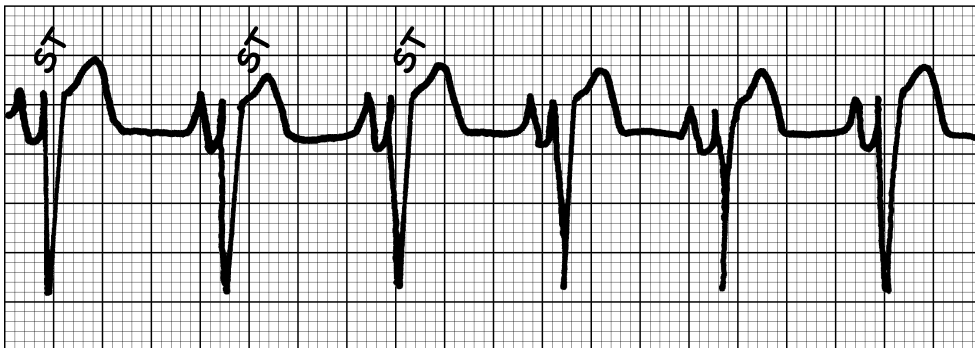
Transmural injuries

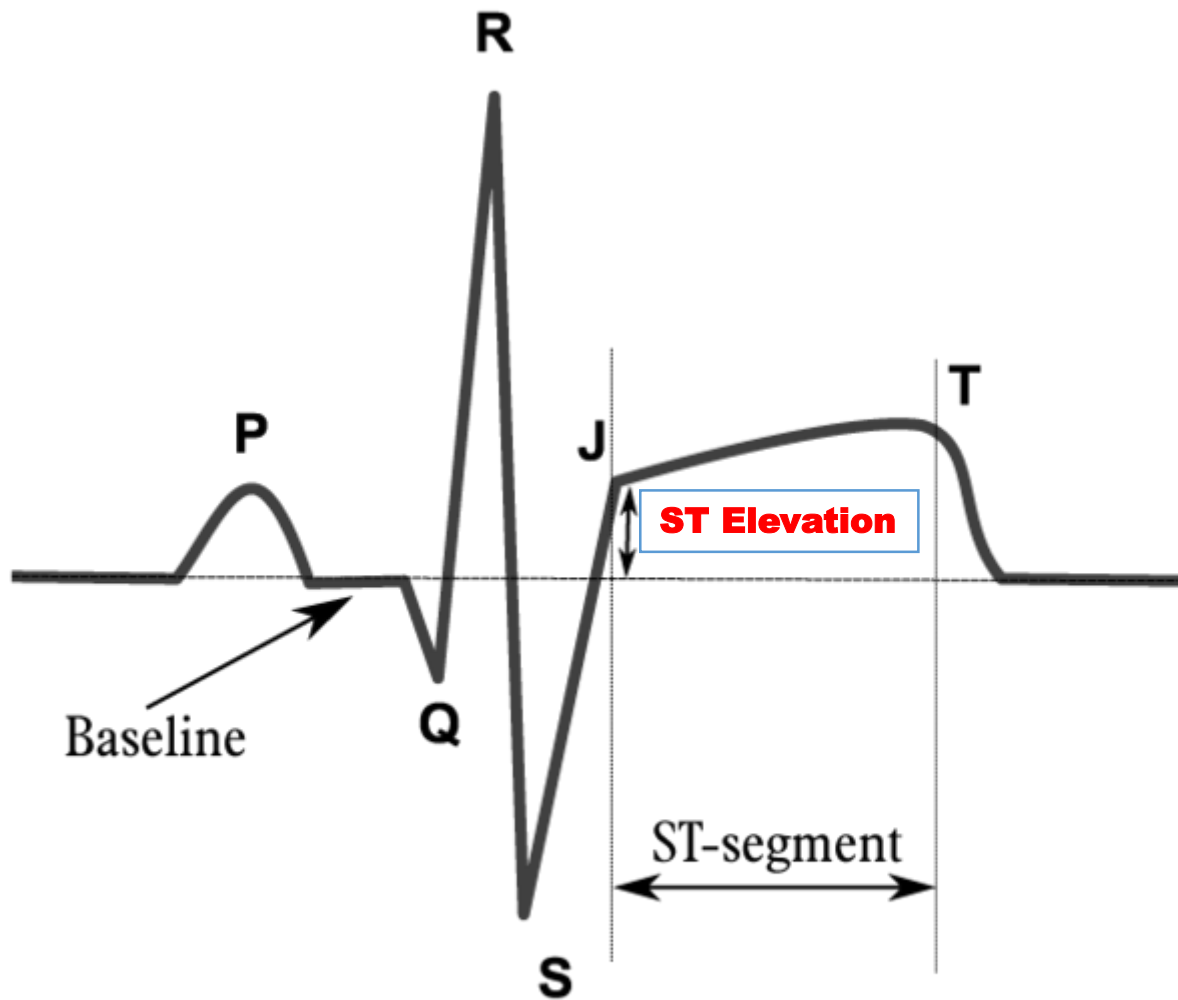


Convex upward



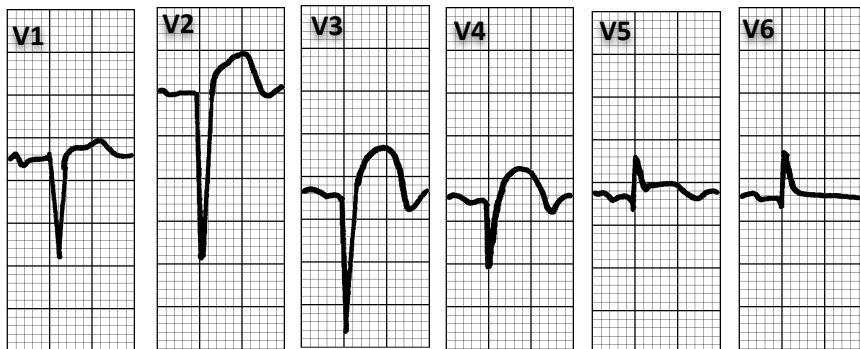
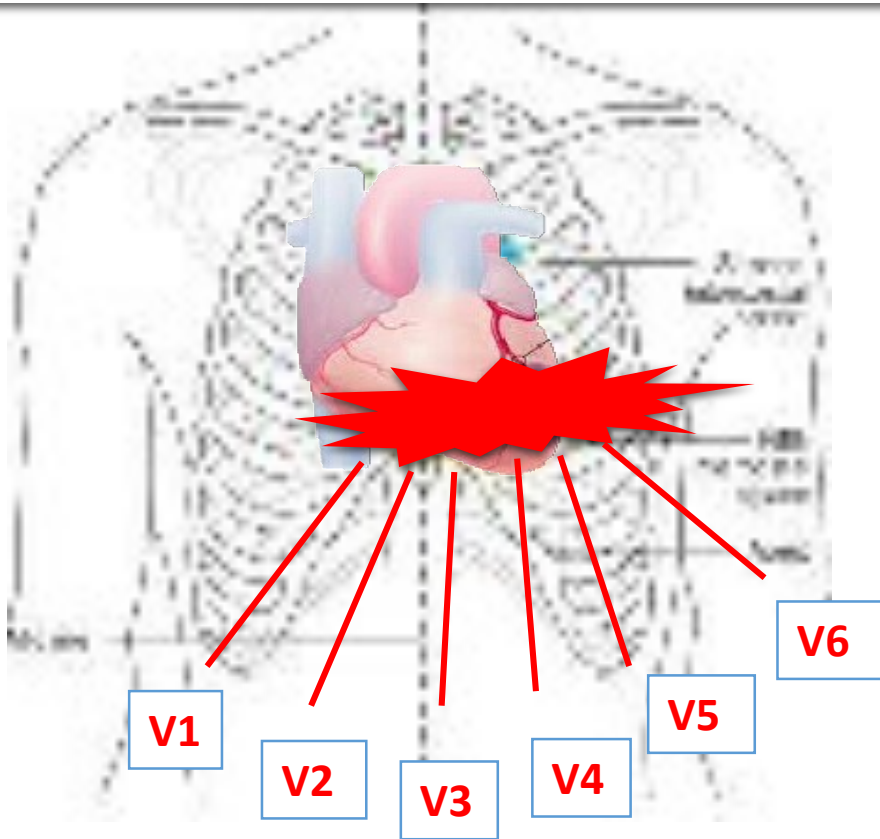
Elevated



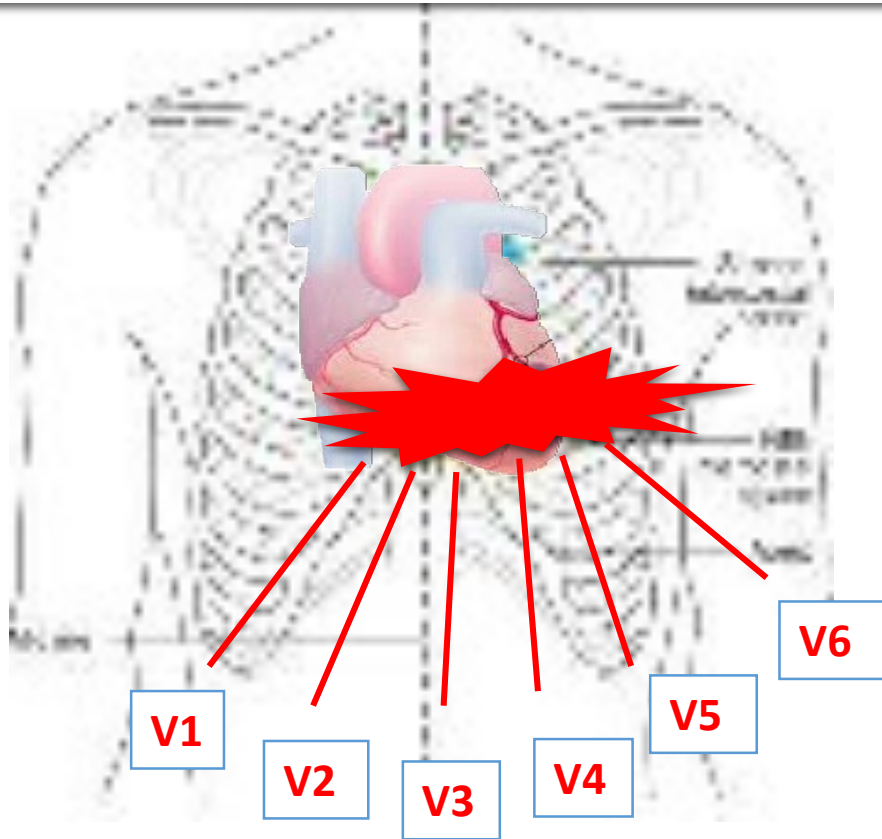


How to Measure ST Elevation?

1 Anterior Wall Myocardial Infarction



1 Anterior Wall Myocardial Infarction



Extent of anterior wall myocardial infarction

V1 + V2: Septal

V3 + V4: Anterior Wall

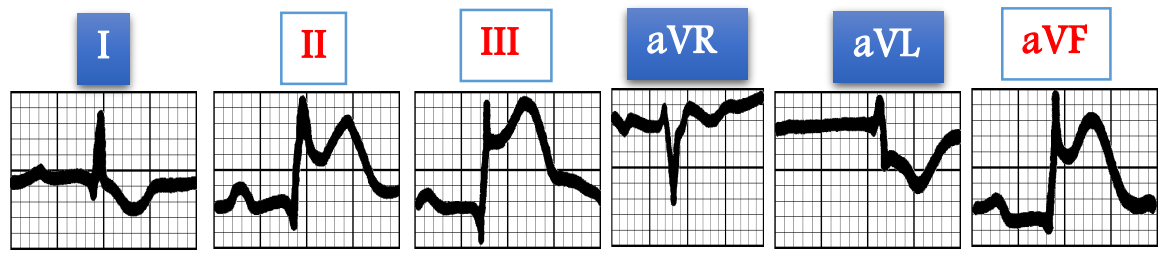
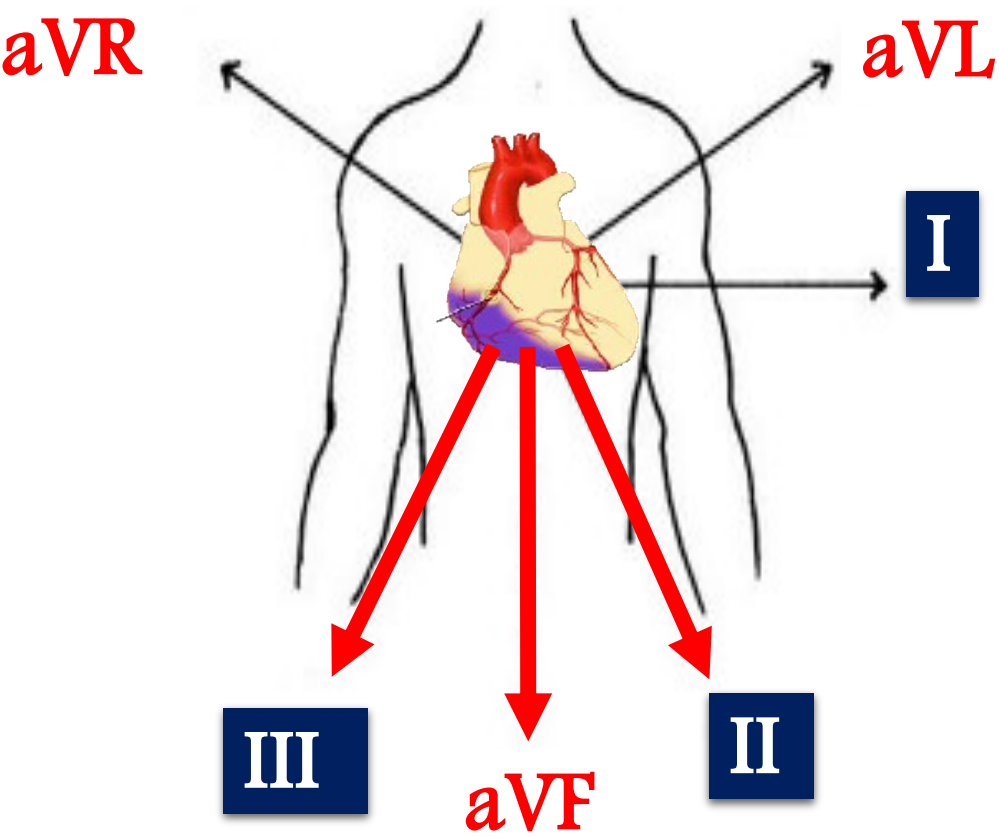
V1+ V2+ V3+ V4: Anteroseptal

V5 + V6: Lateral wall

V3 + V4+ V5+ V6: Anterolateral

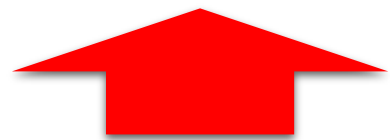
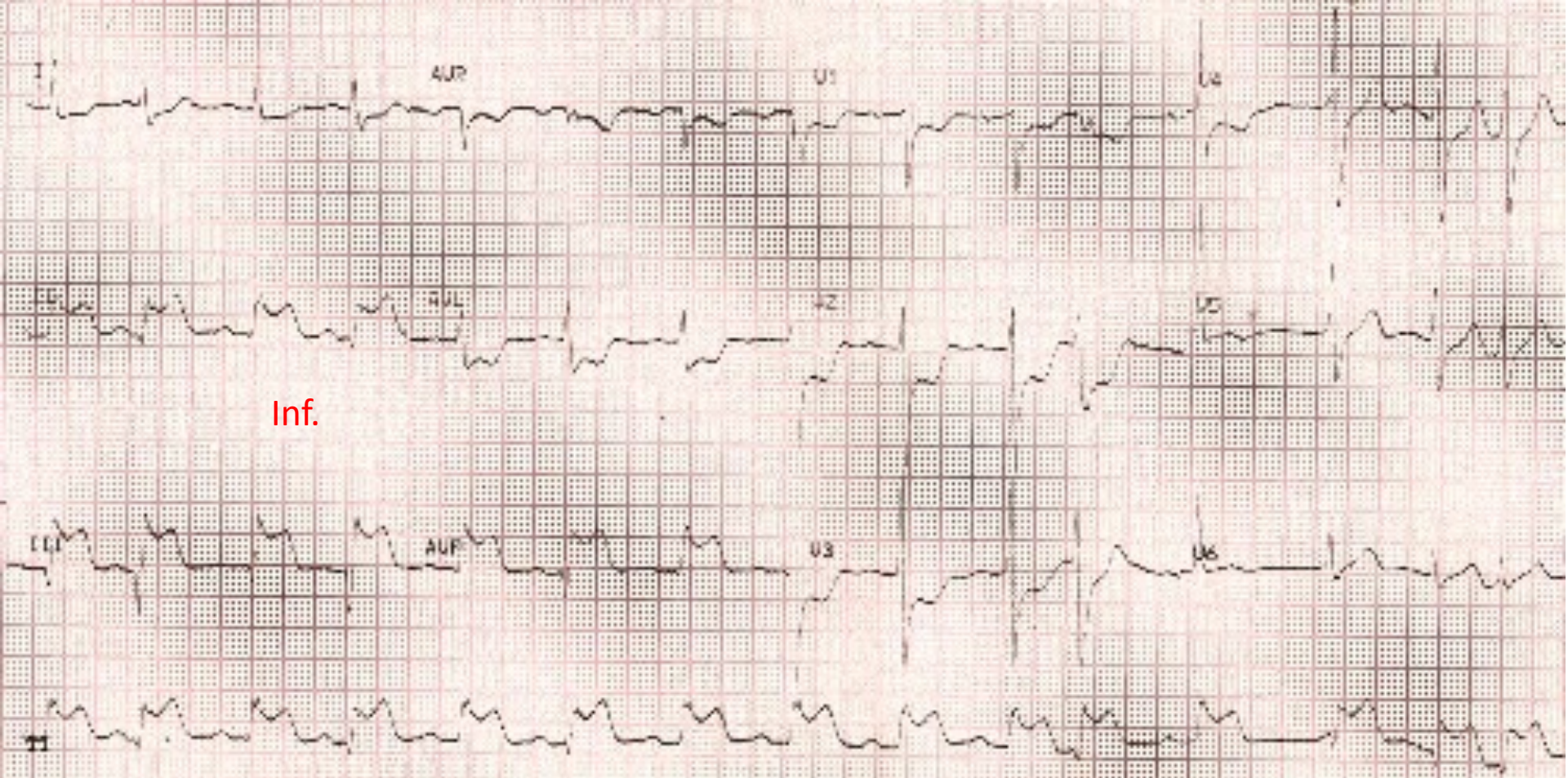
ALL : Extensive Anterior Wall Myocardial Infarction

2 Inferior Wall Myocardial Infarction



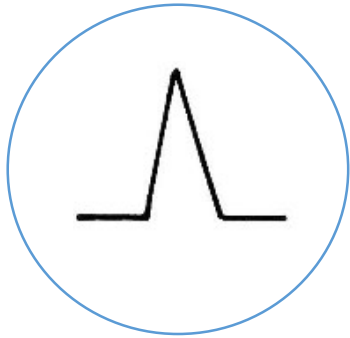


Anterior wall MI

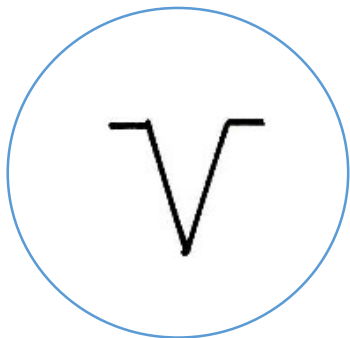


Inferior Wall MI

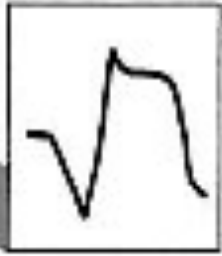
3 Posterior Wall Myocardial Infarction



Posterior



Anterior



**Posterior Wall
Myocardial
Infarction**



**ECG in
anterior
leads**

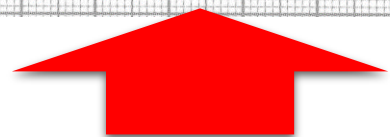
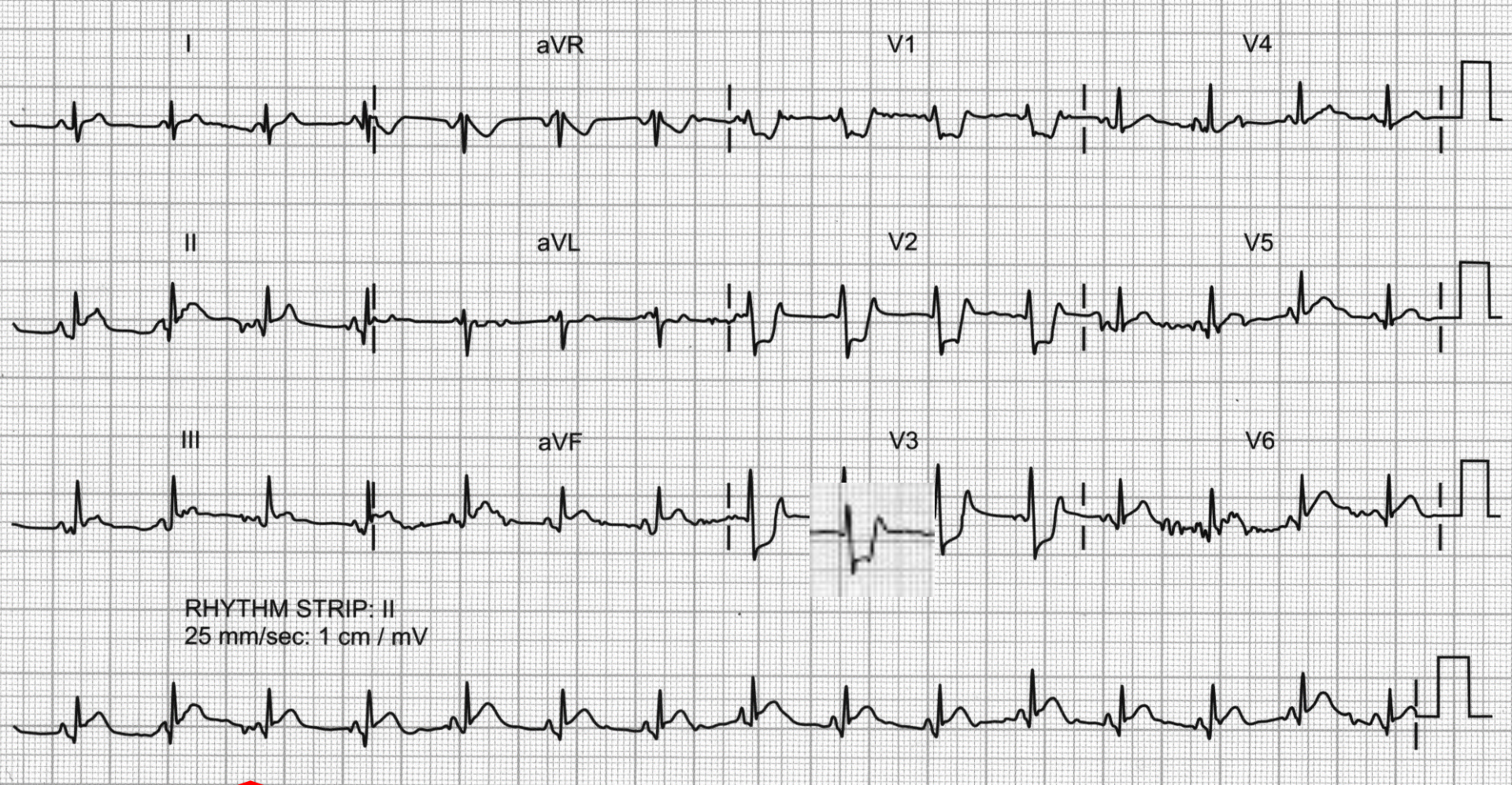
Posterior wall Myocardial Infarction

Posterior Wall MI

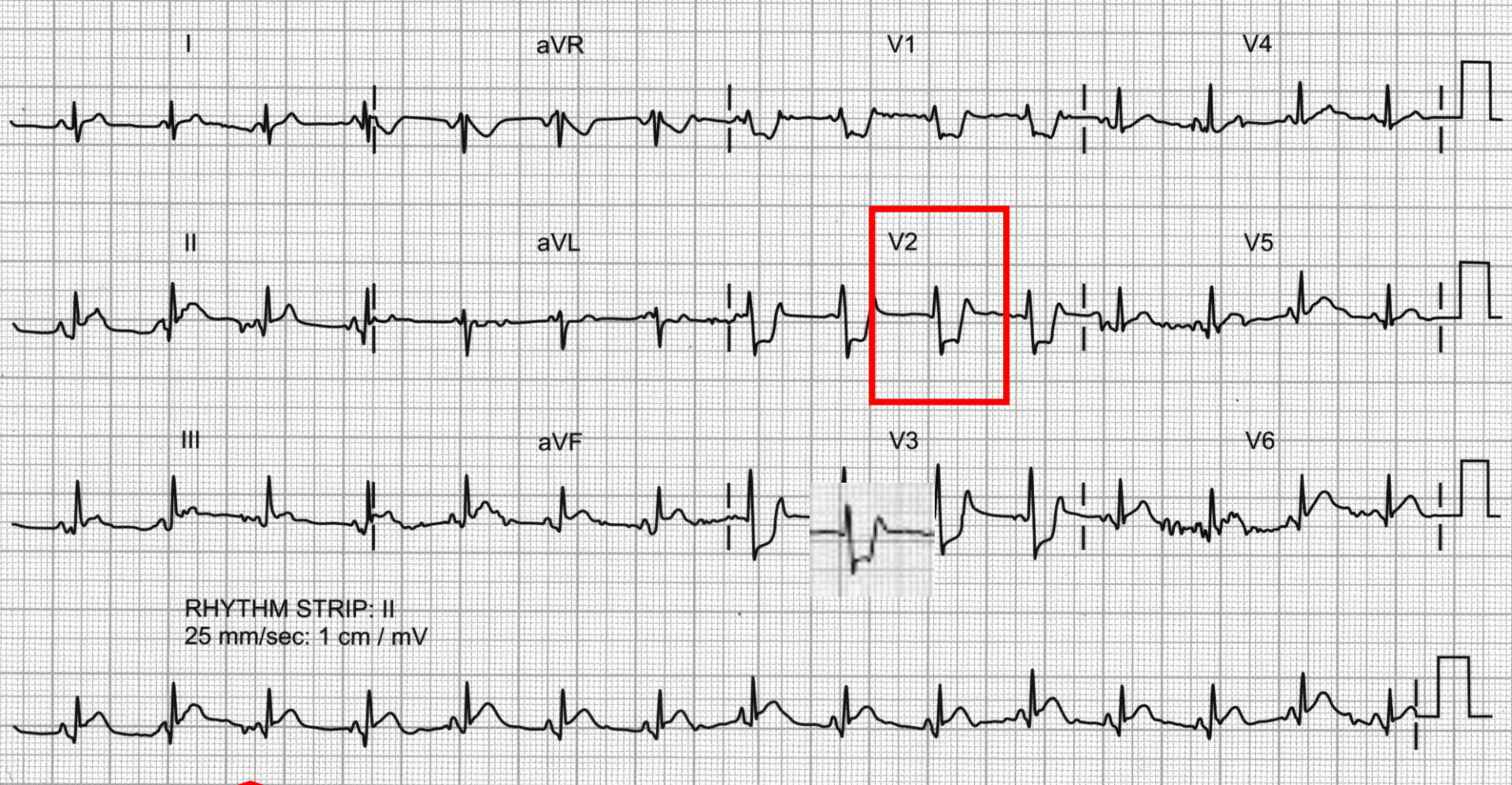


V1

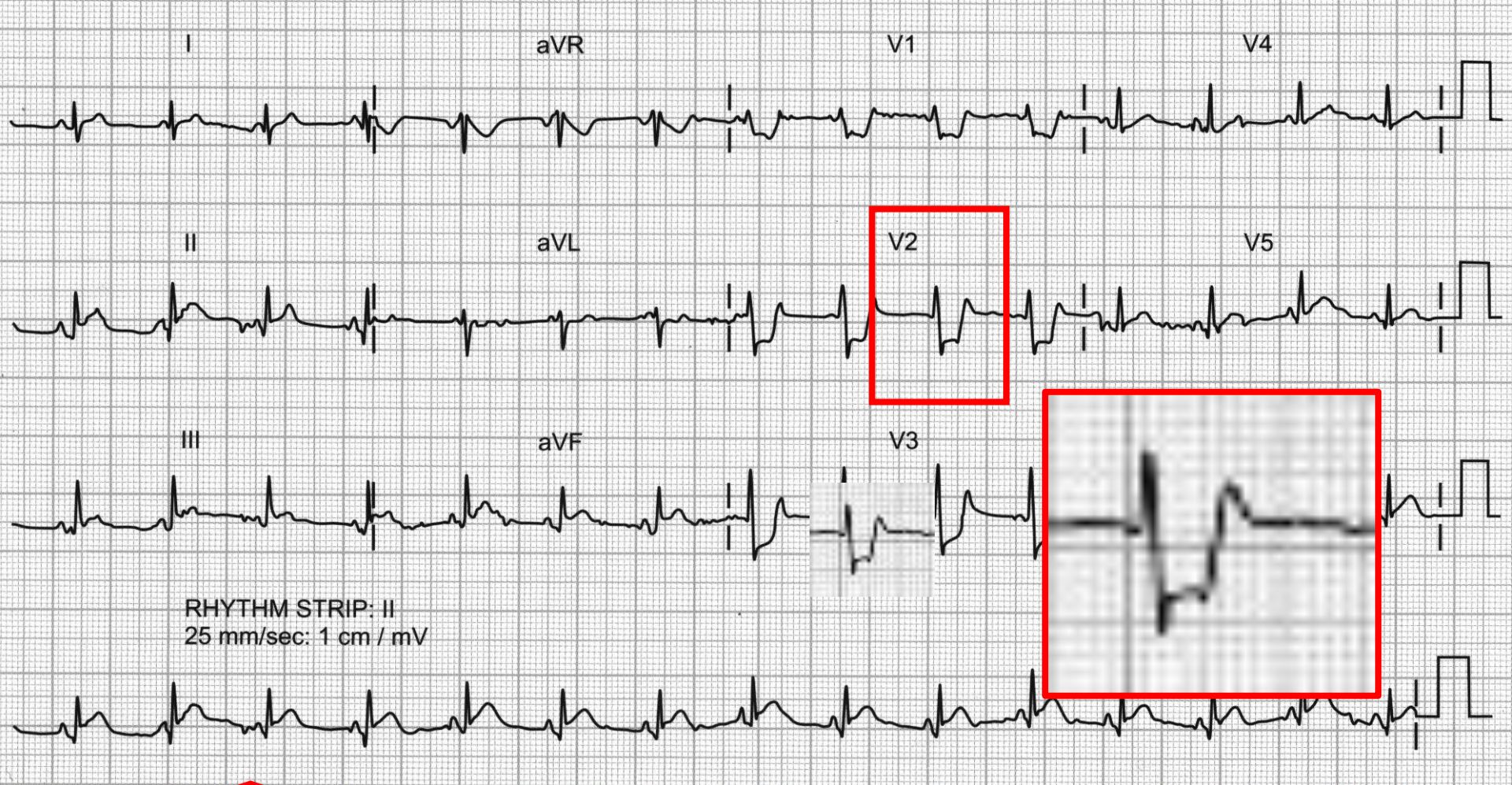




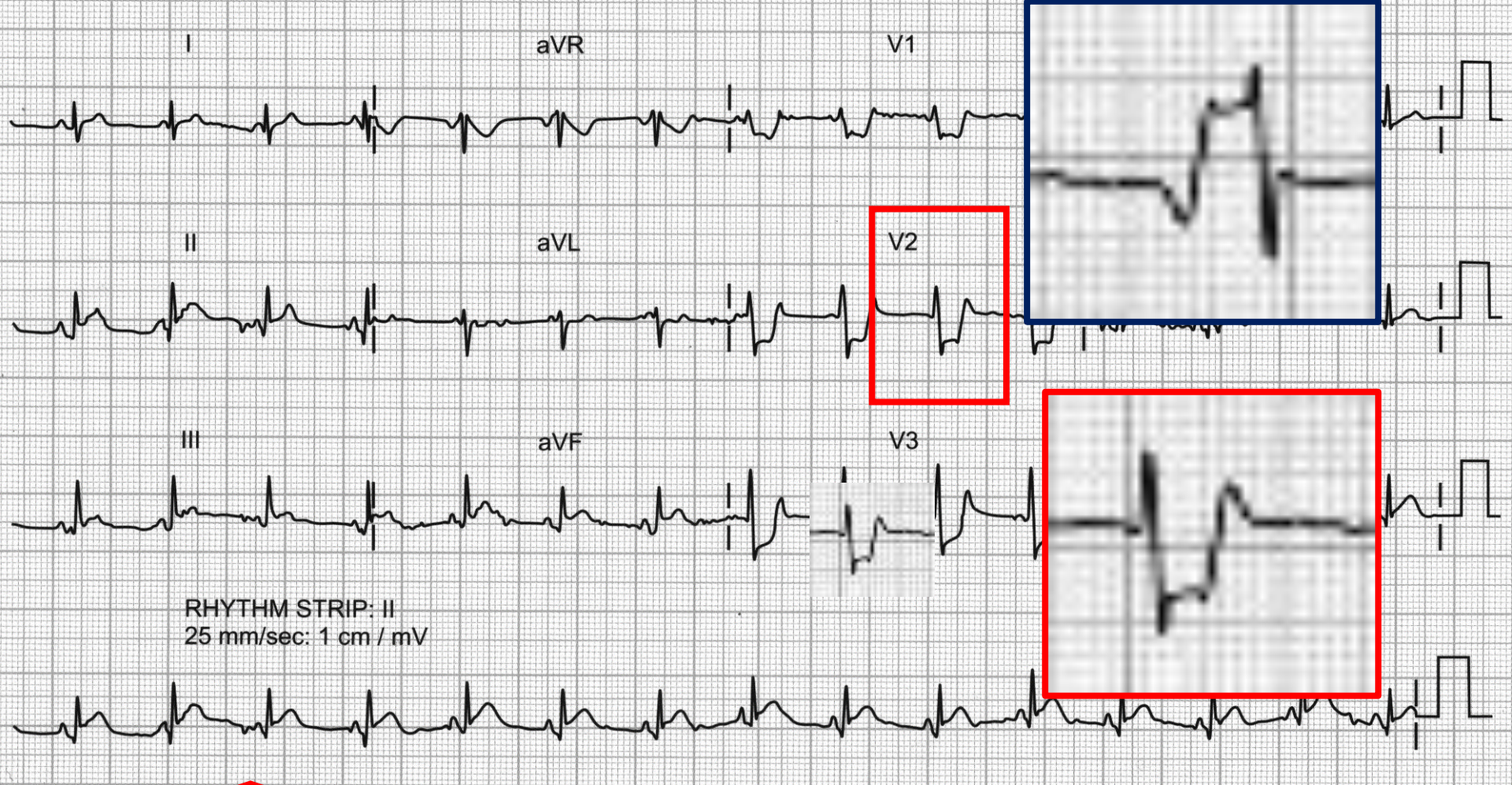
Posterior Wall MI



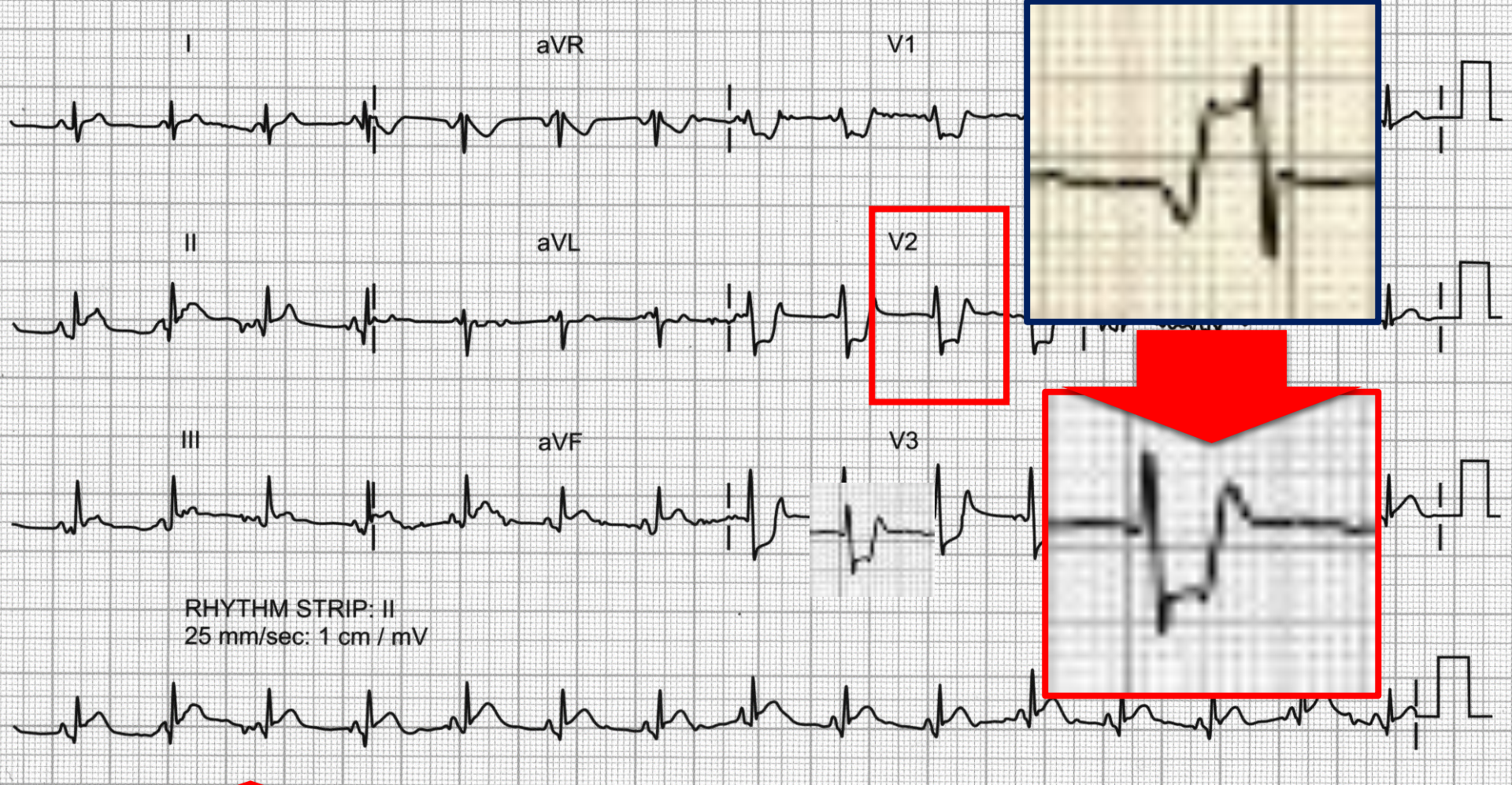
Posterior Wall MI



Posterior Wall MI



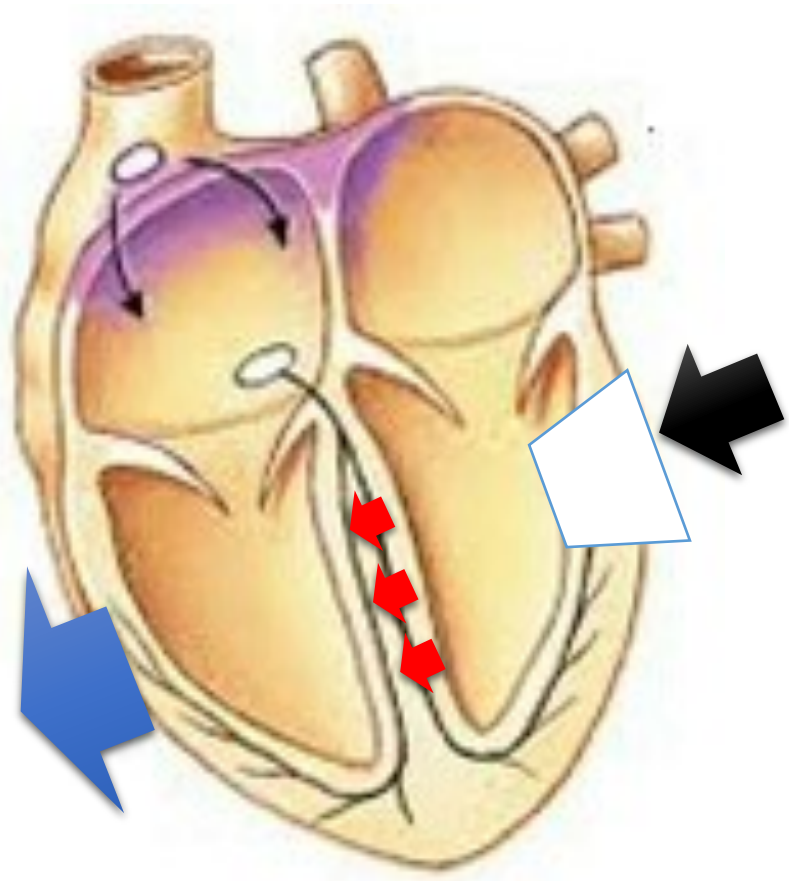
Posterior Wall MI



Posterior Wall MI

4 Non Q wave infarction

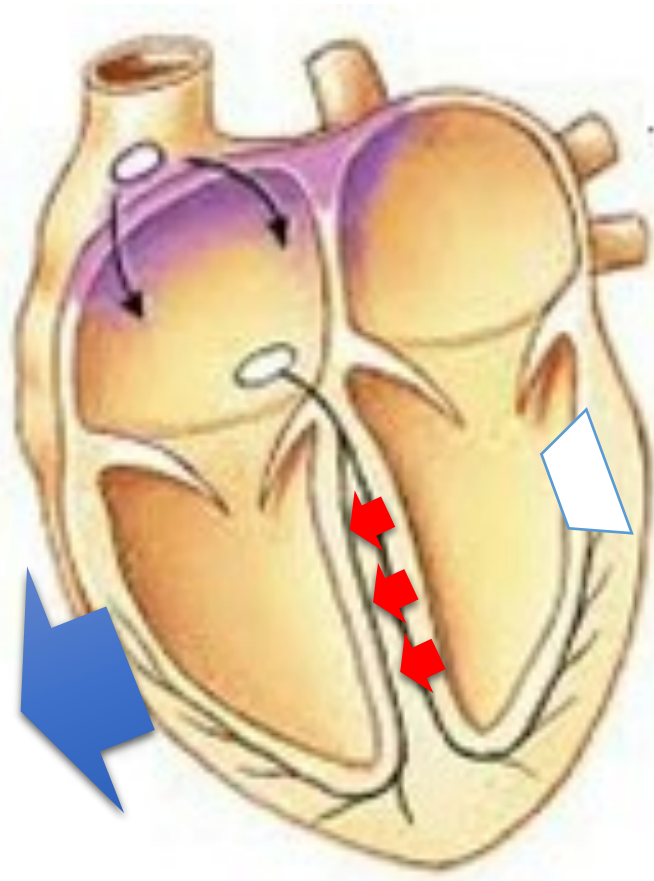
**Subendocardial
Infarction**



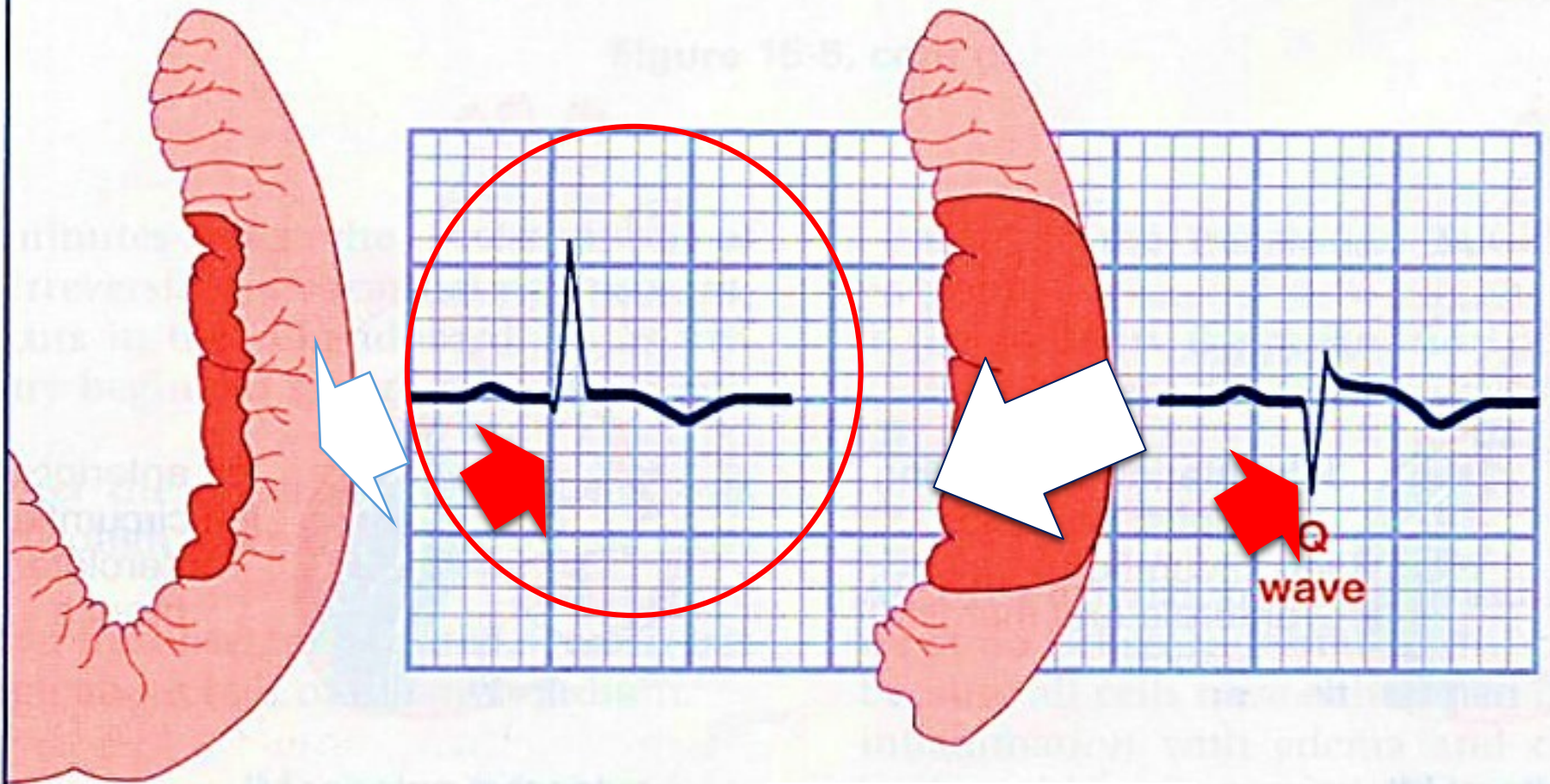
**Non Q
wave
infarction**

4 Non Q wave infarction

Subendocardial Infarction

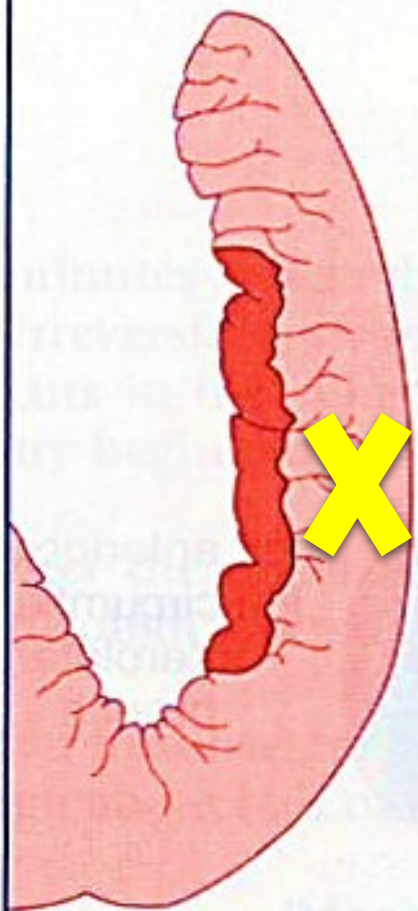


**Non Q
wave
infarction**

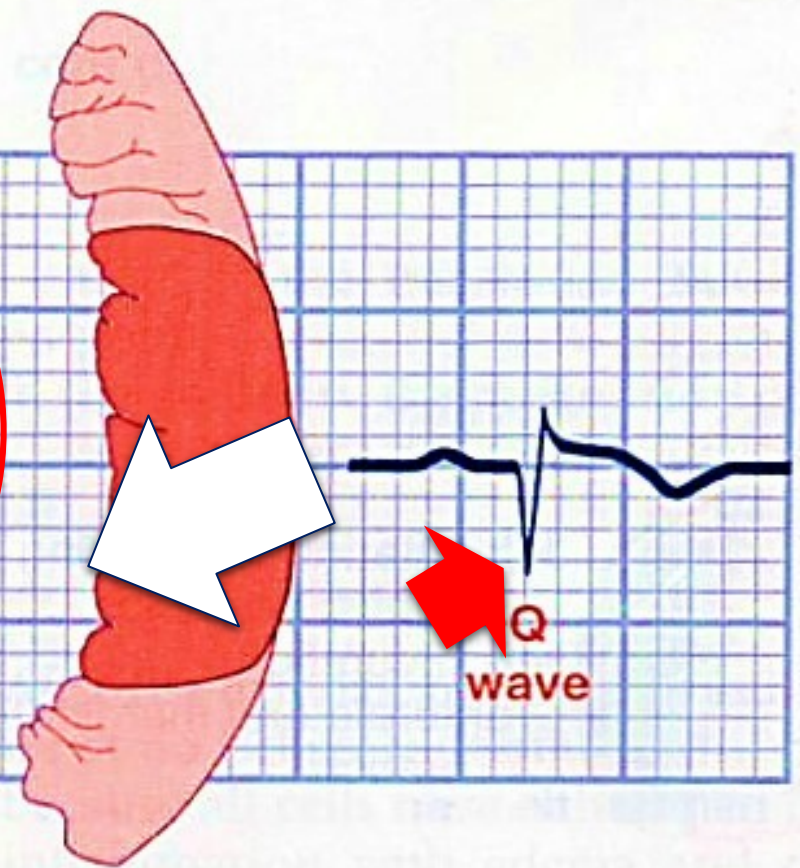


Non Q- wave MI
Subendocardial

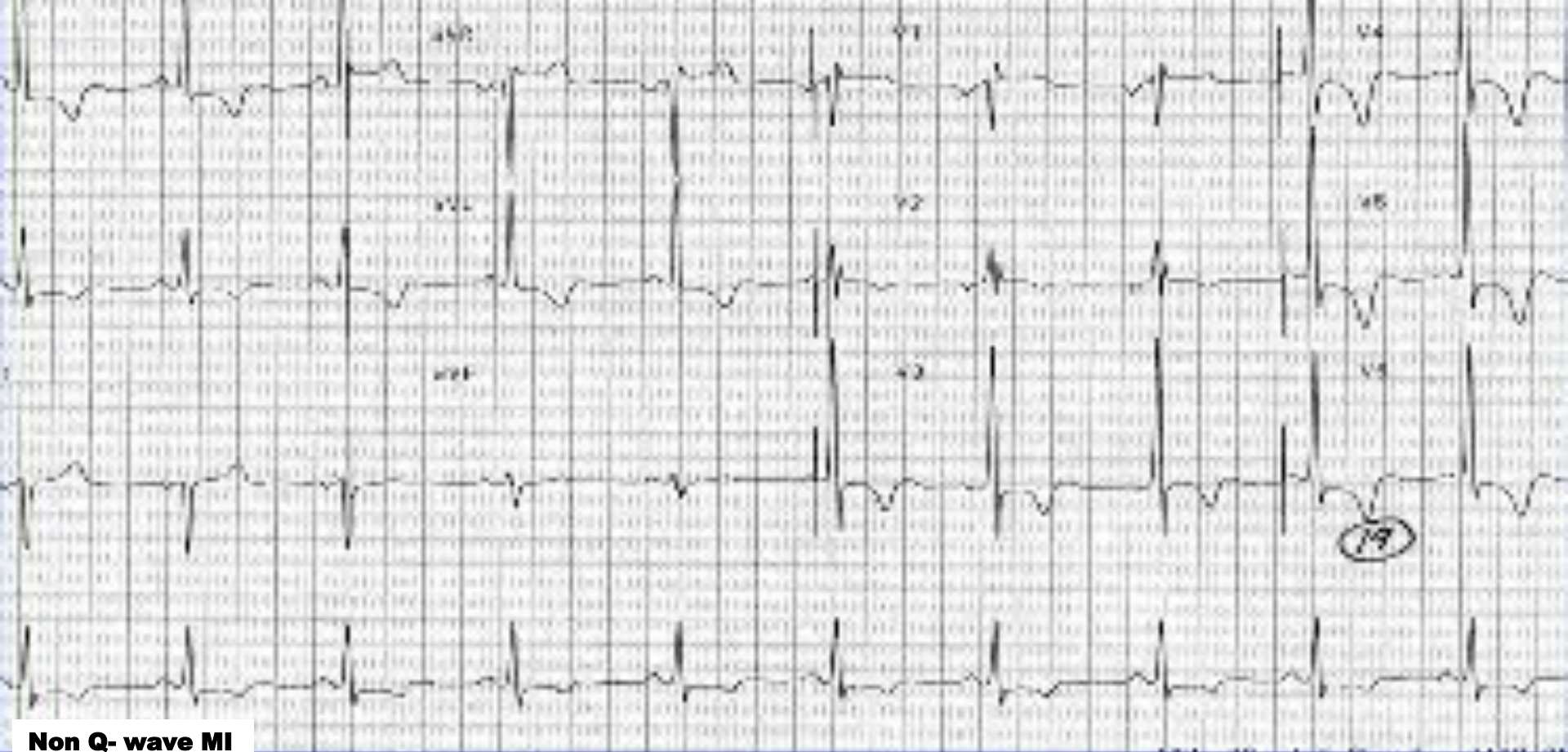
Q- wave MI
Transmural



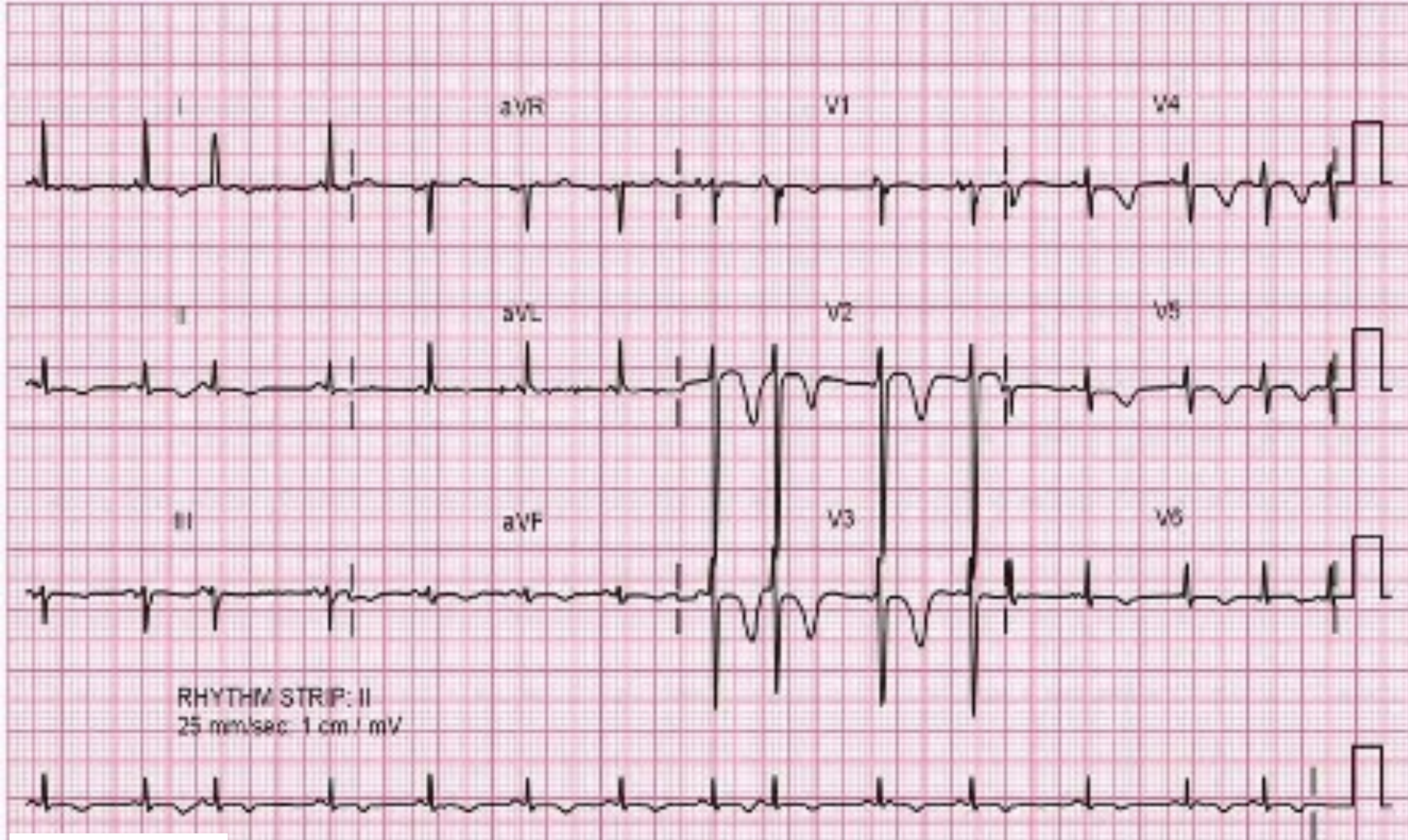
Non Q- wave MI
Subendocardial



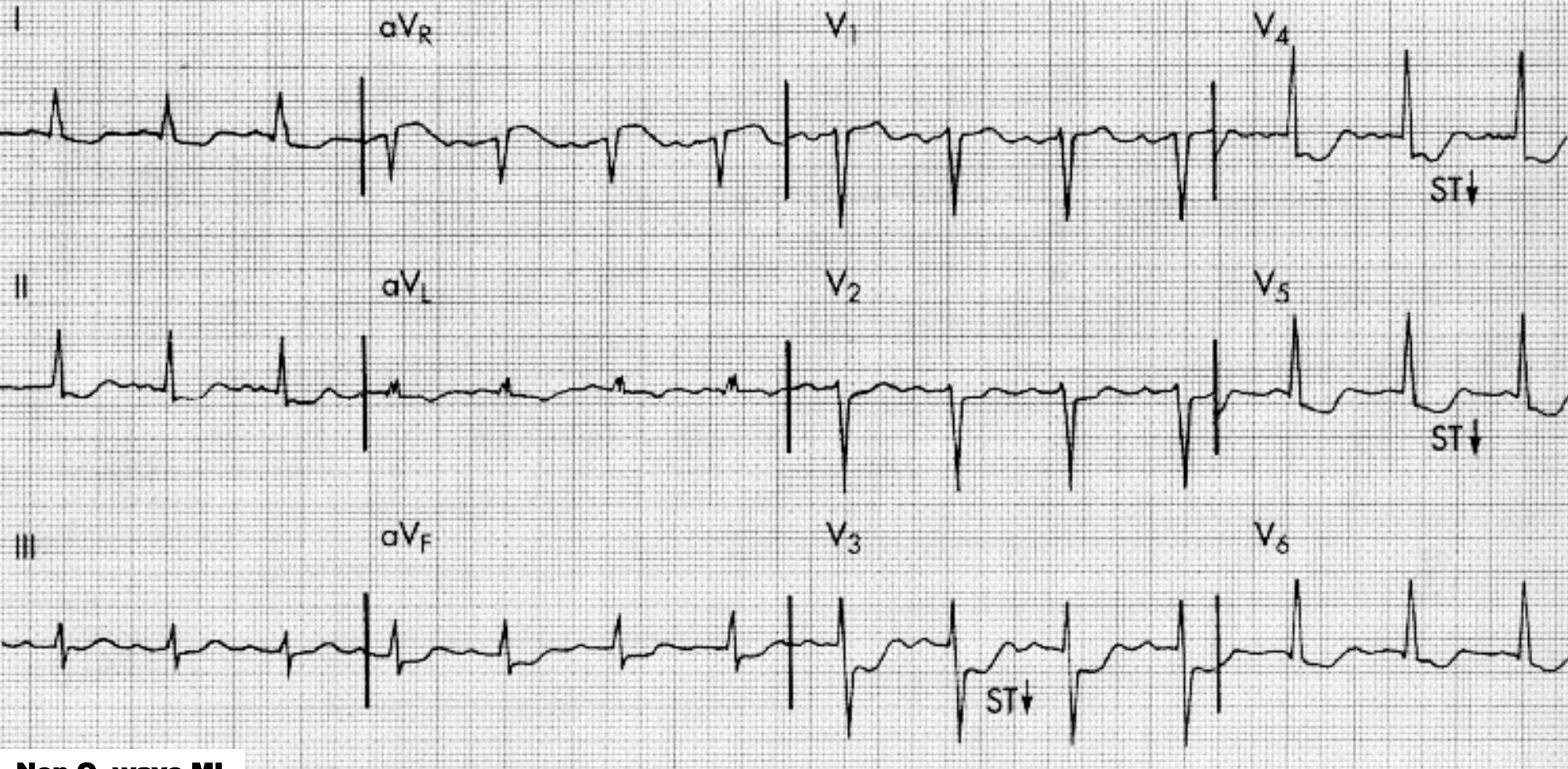
Q- wave MI
Transmural



Non Q- wave MI
Subendocardial

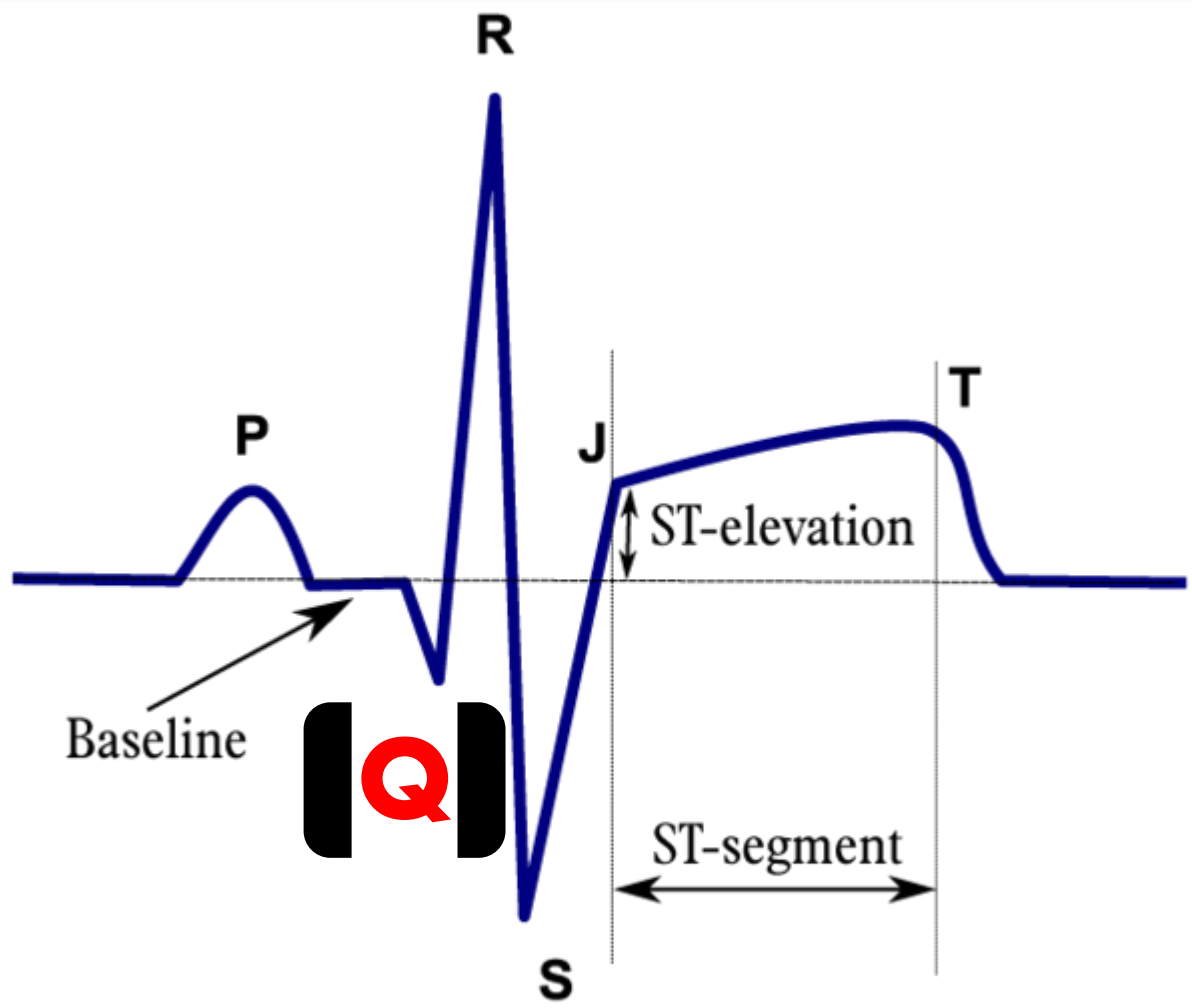


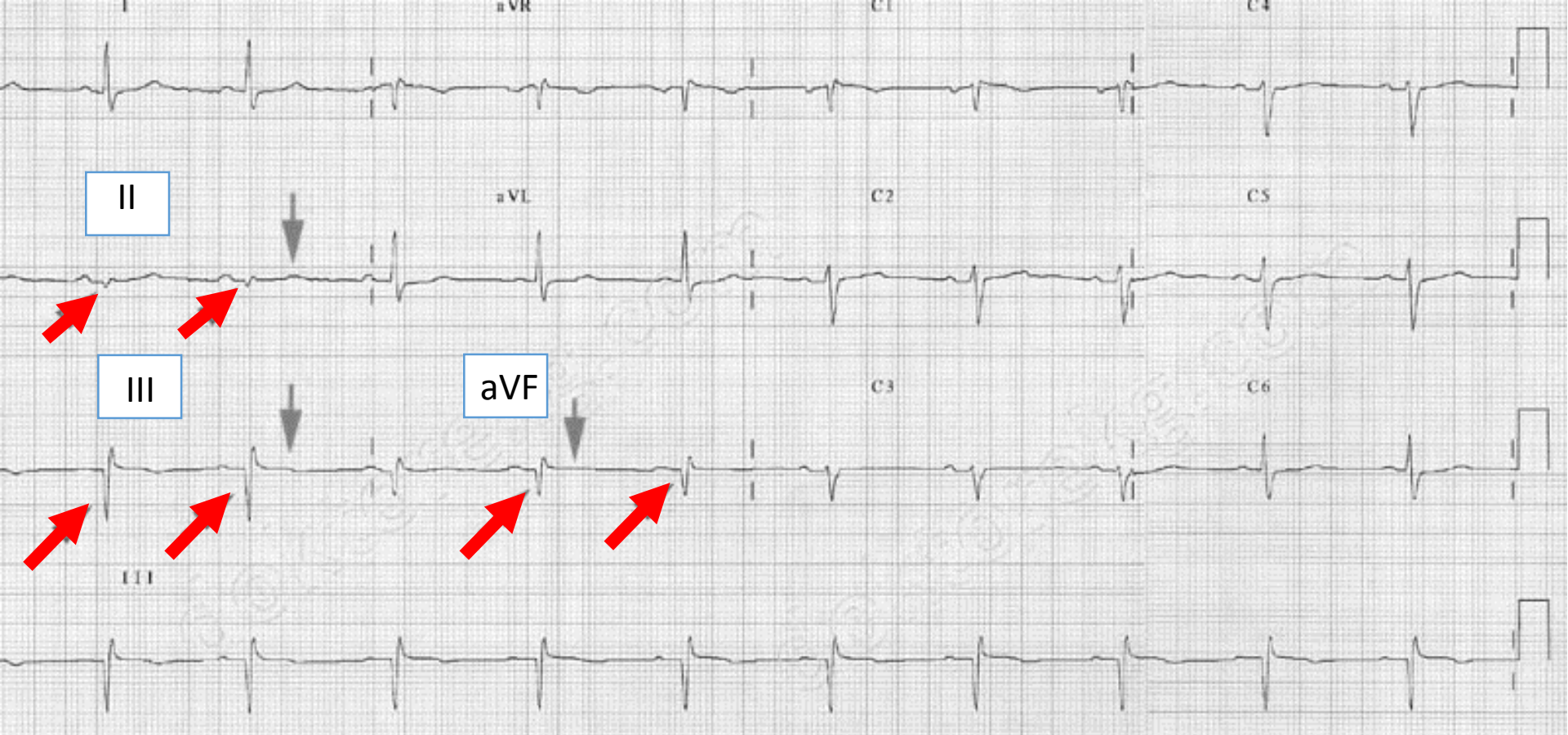
Non Q- wave MI
Subendocardial



Non Q- wave MI
Subendocardial

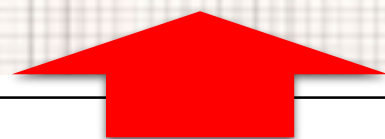
5 Old Myocardial Infarction





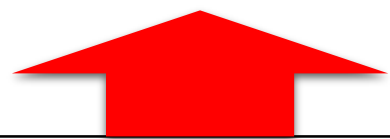
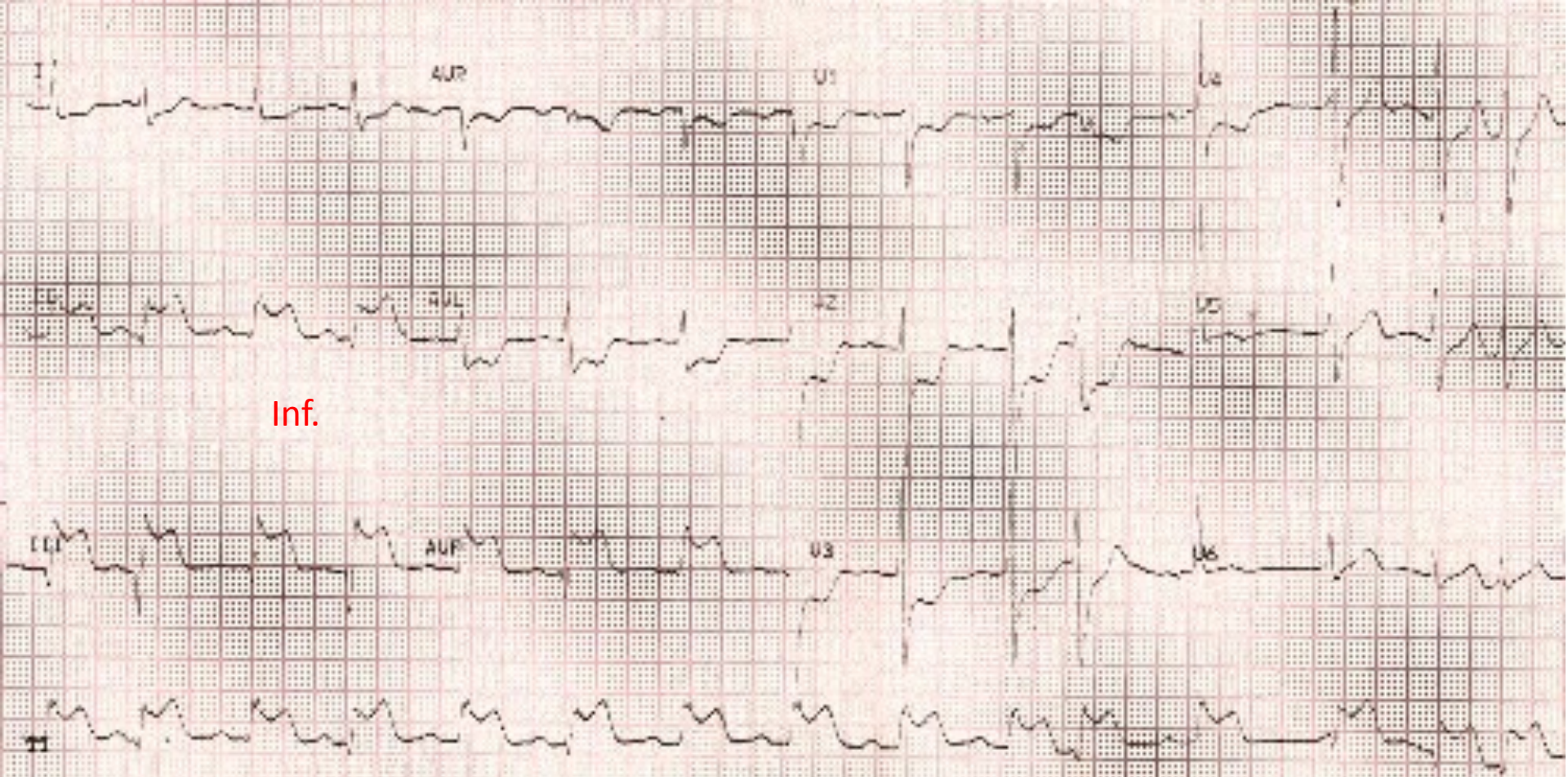
**Let us Revise
AMI**

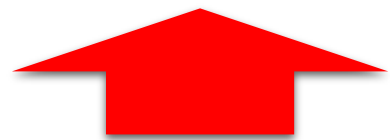
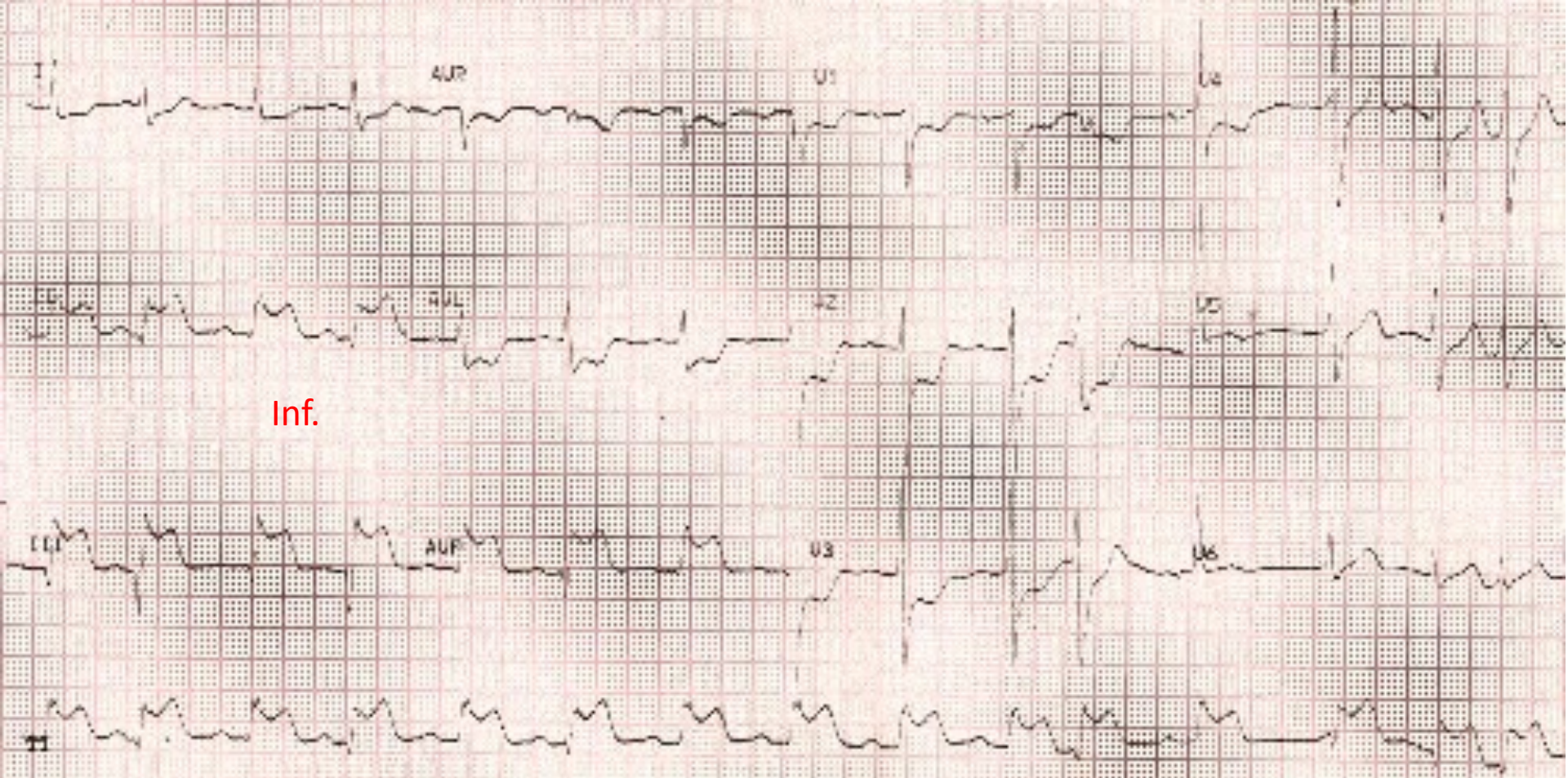




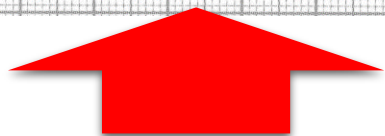
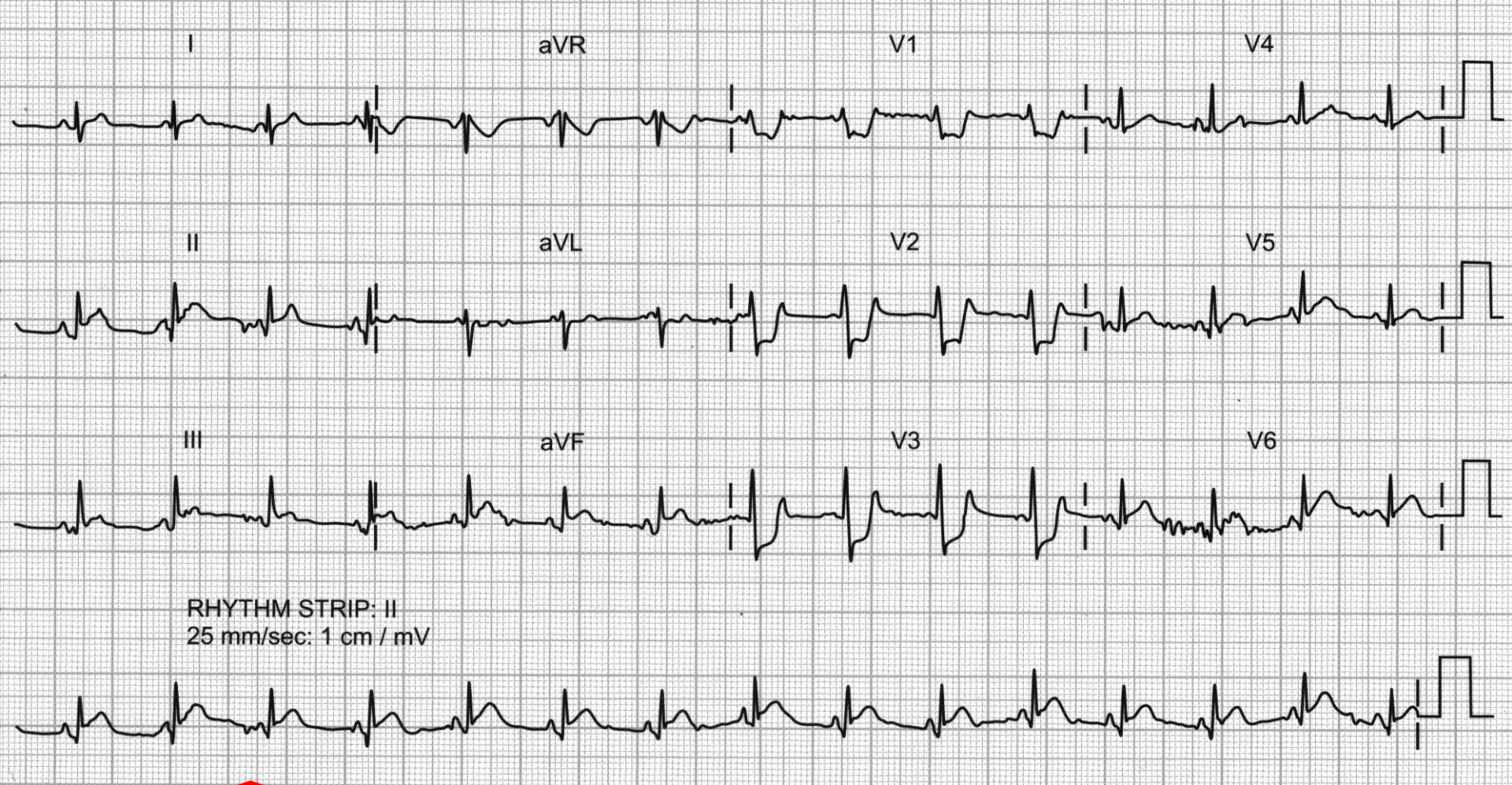


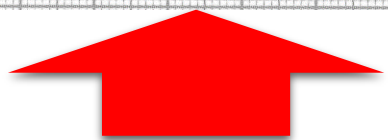
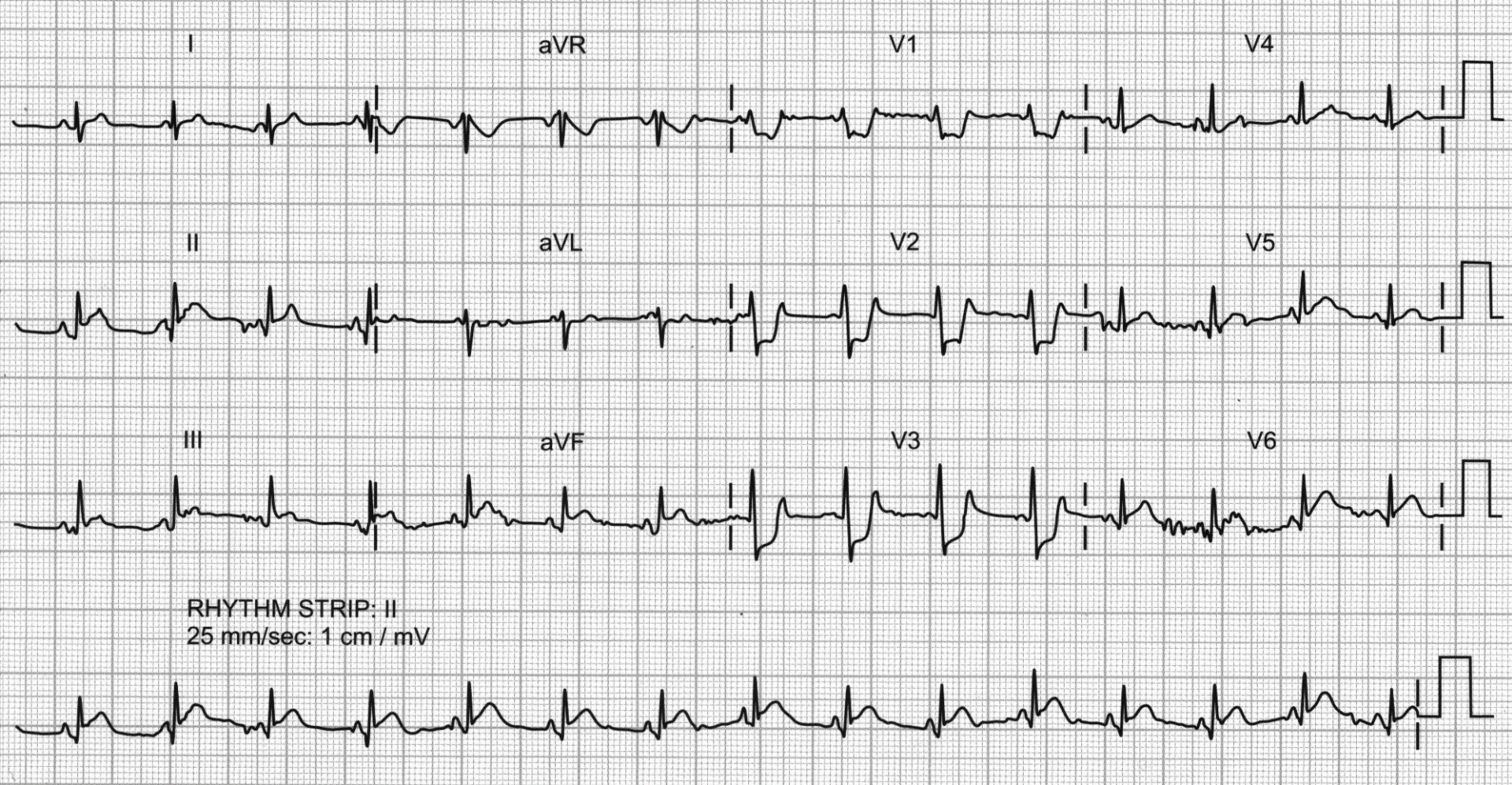
Anterior wall MI



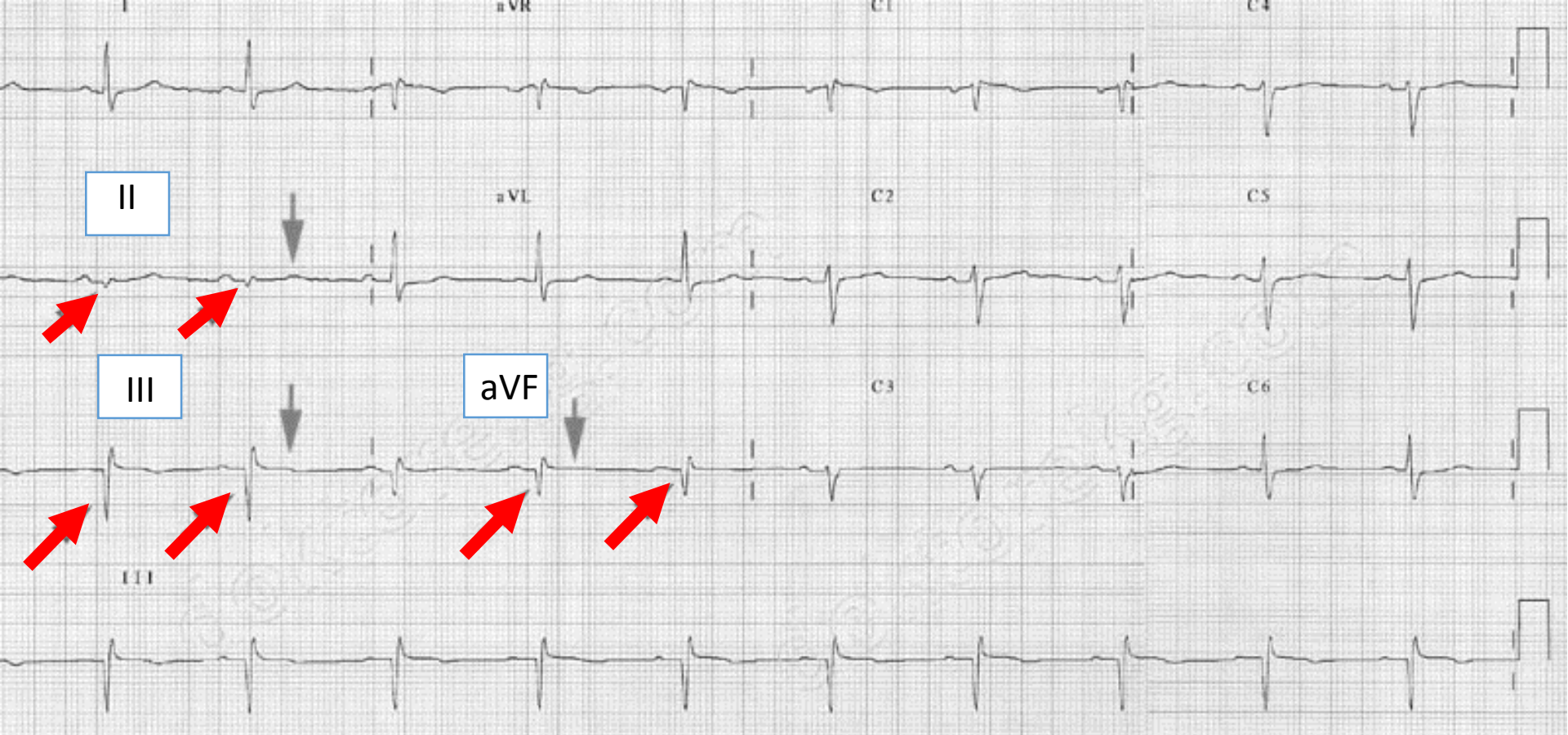


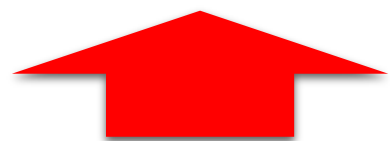
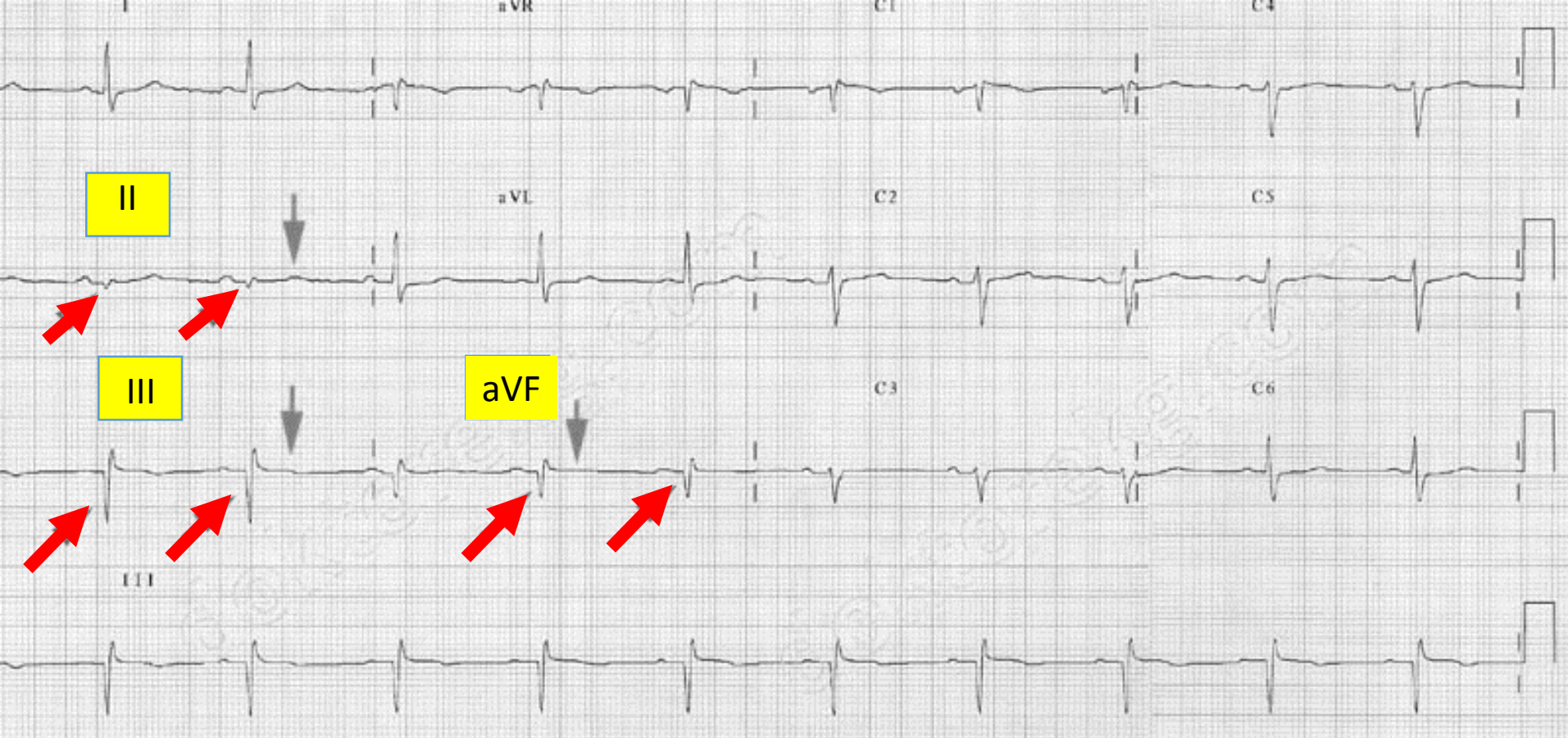
Inferior Wall MI





Posterior Wall MI





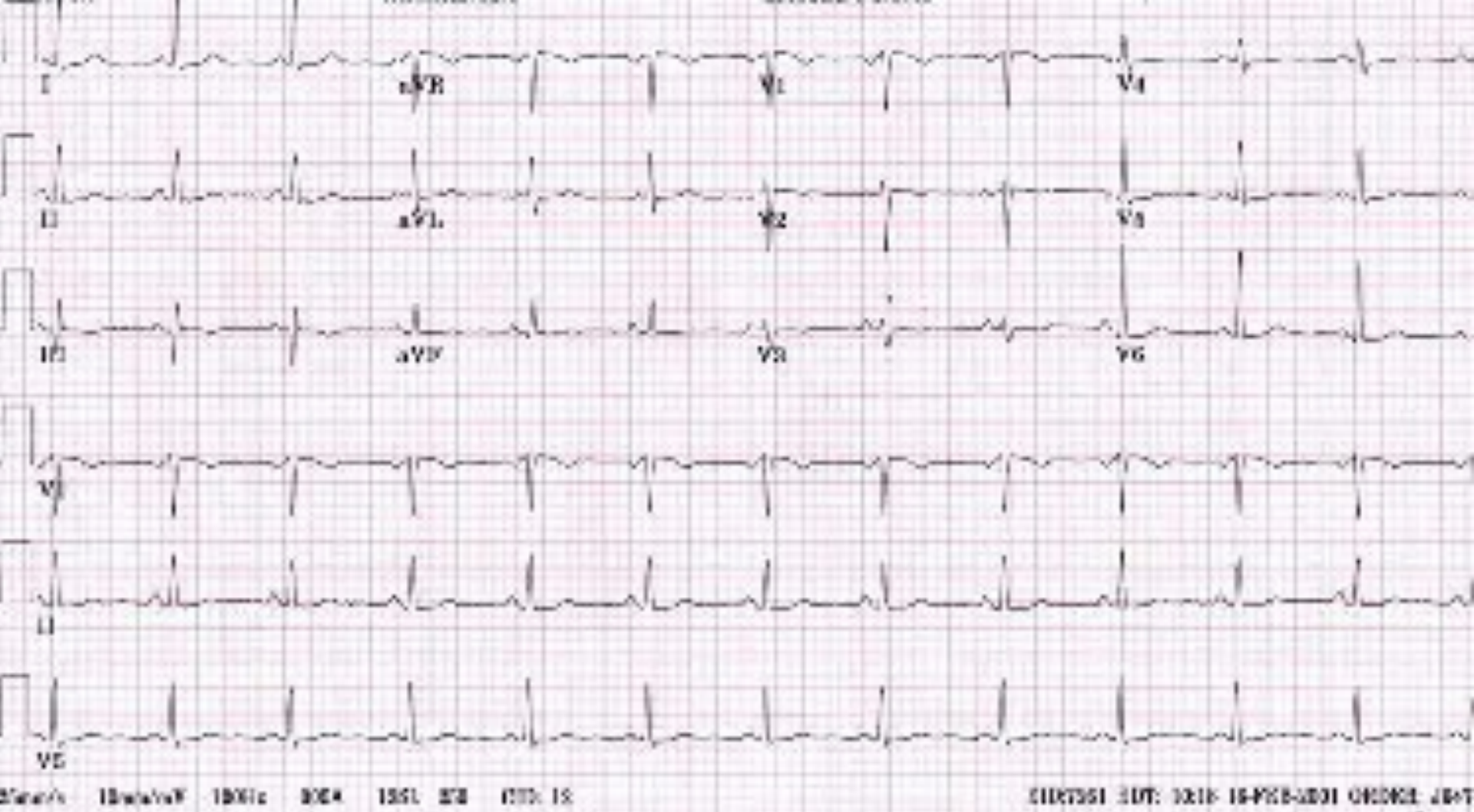
Old MI

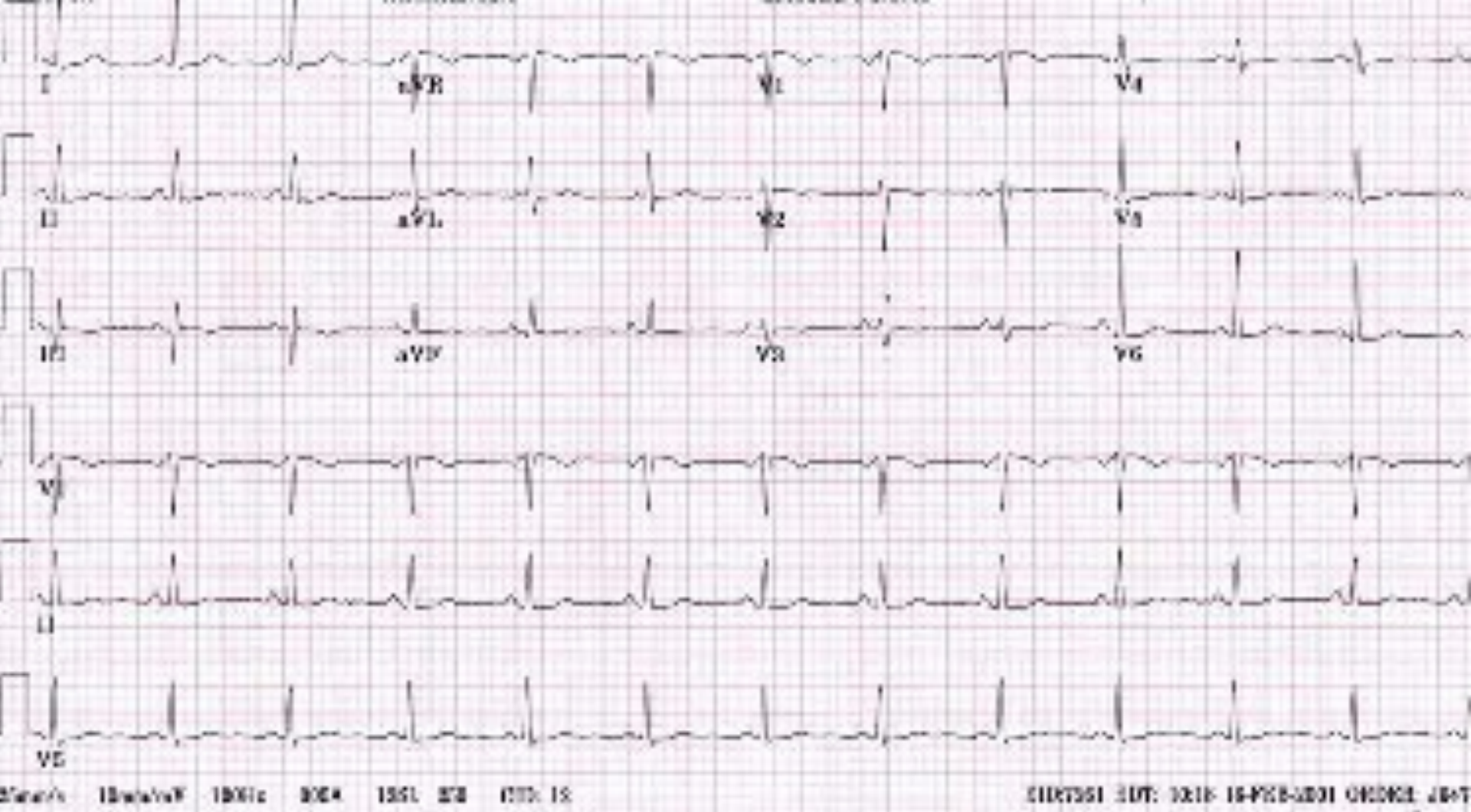
Test Yourself



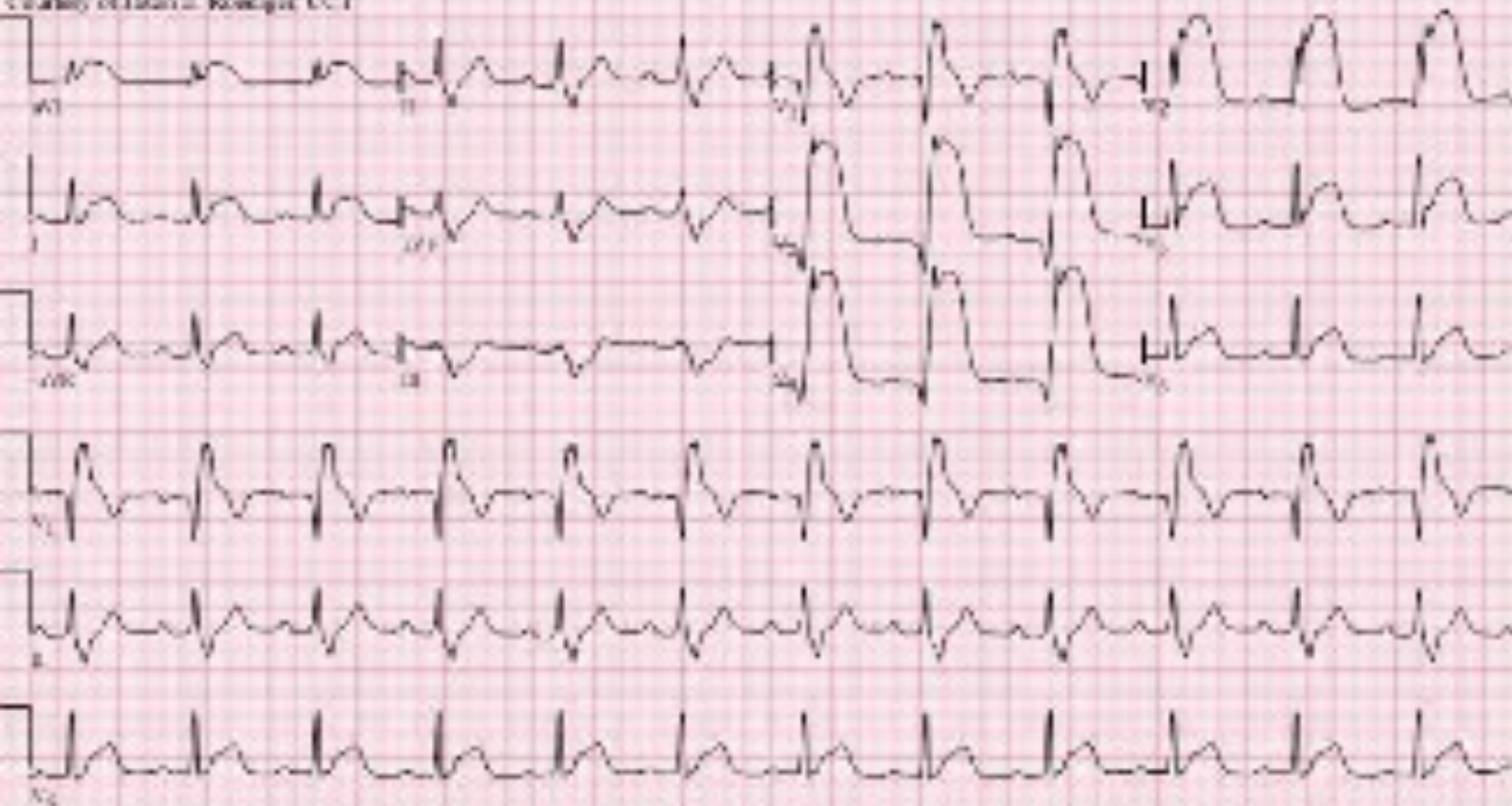
What is the main abnormality?

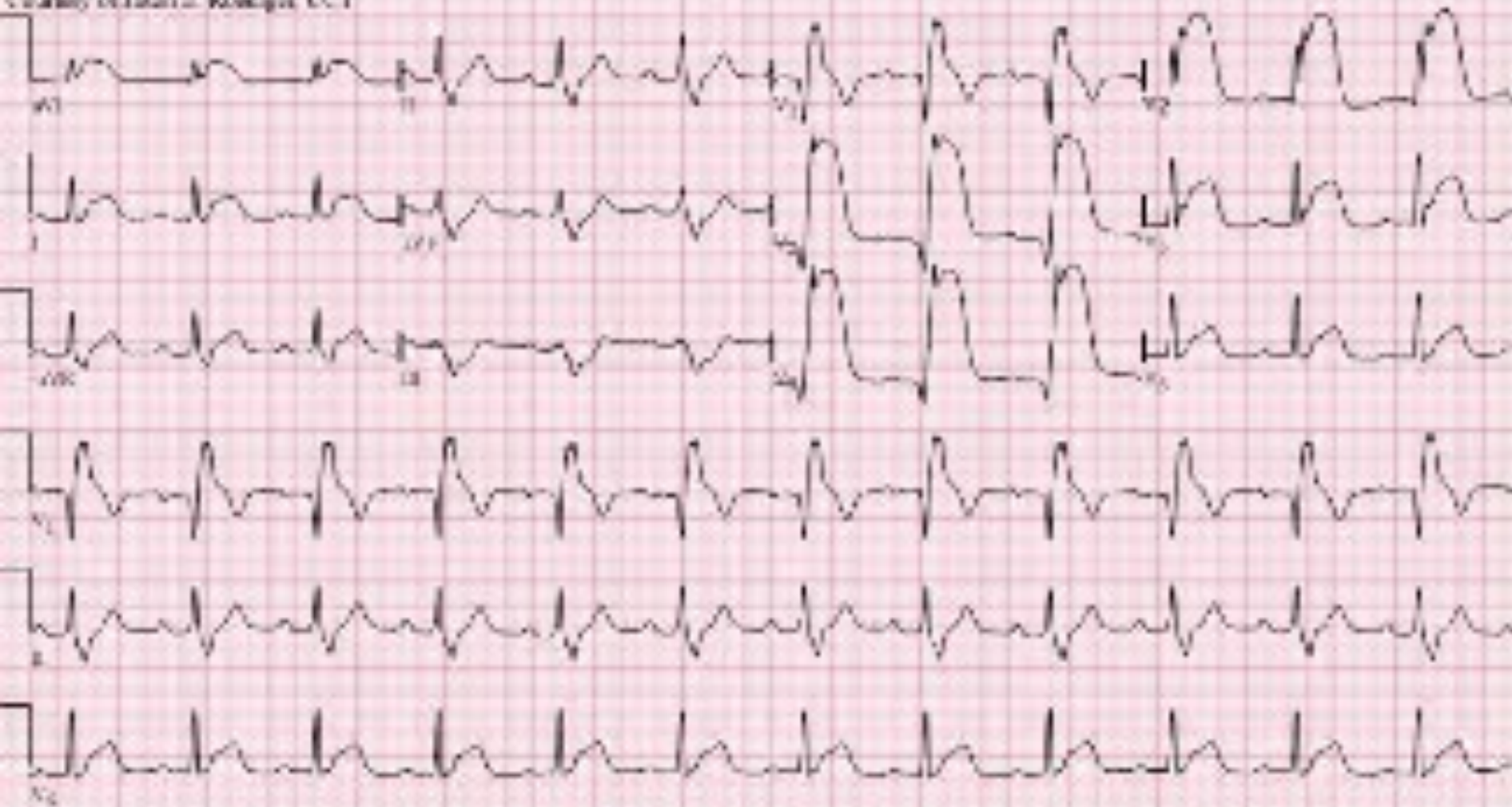






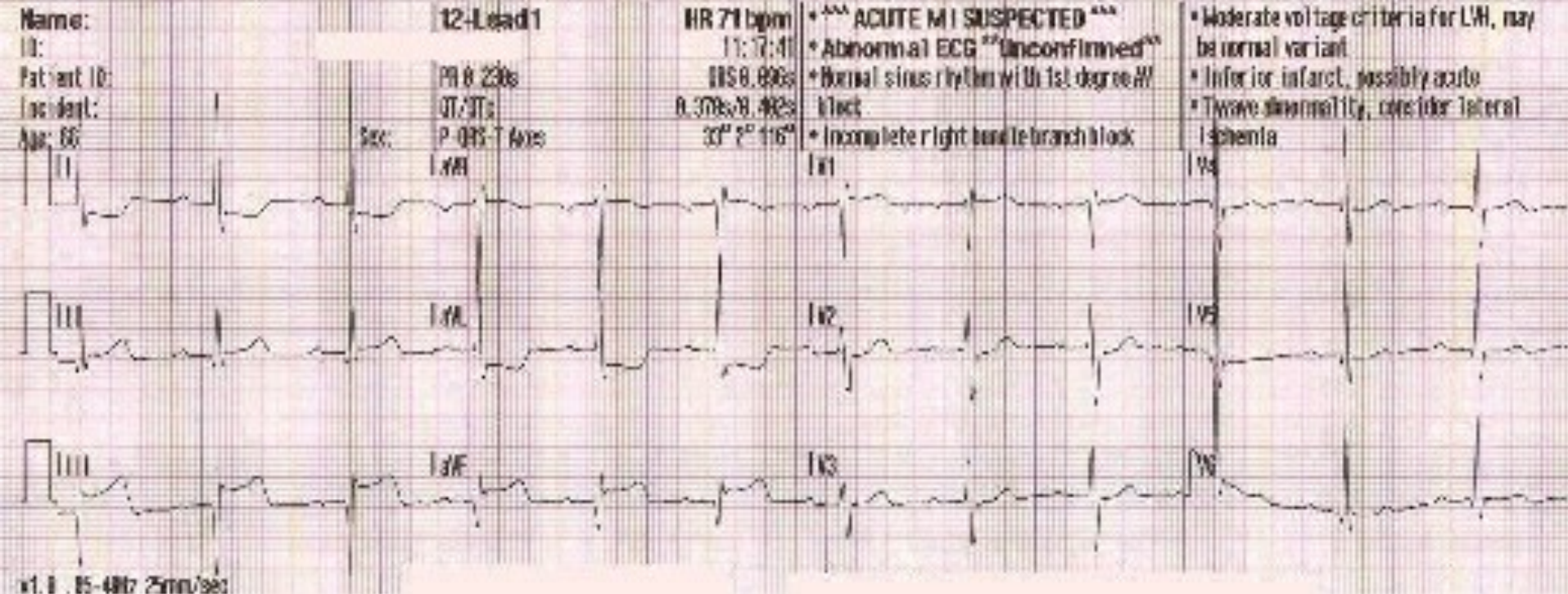
Normal

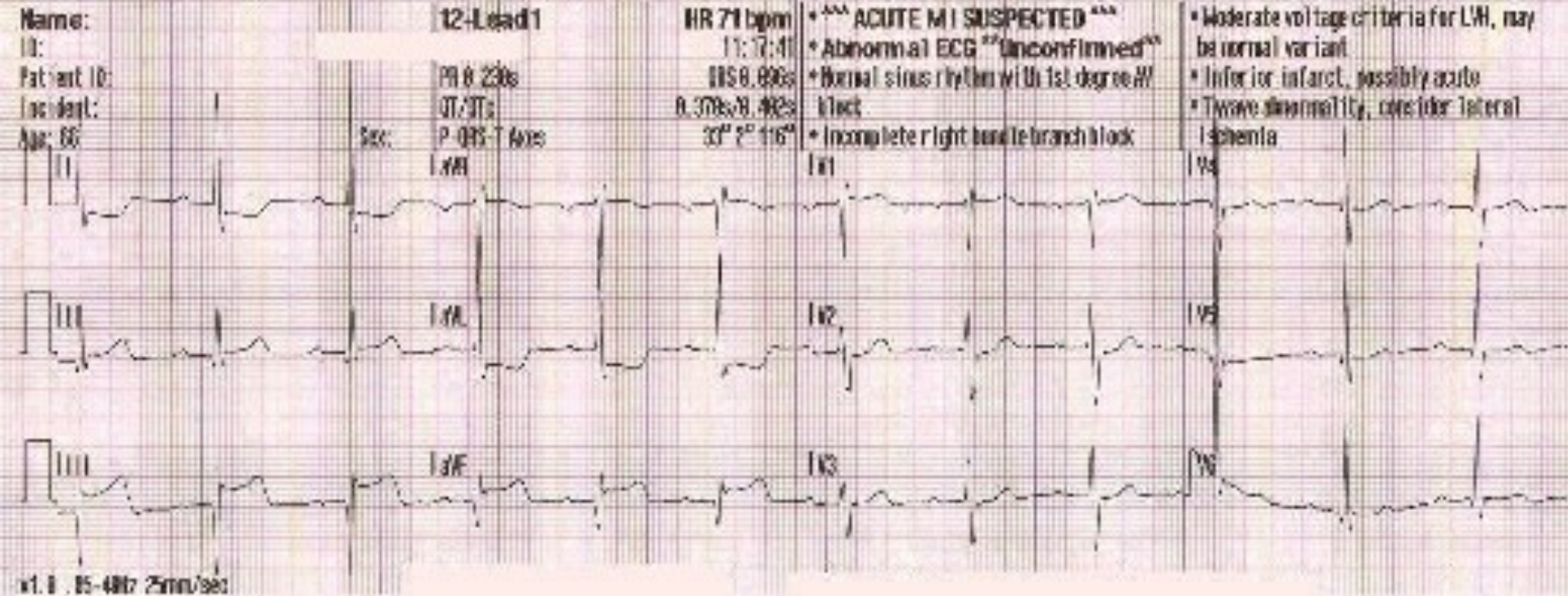




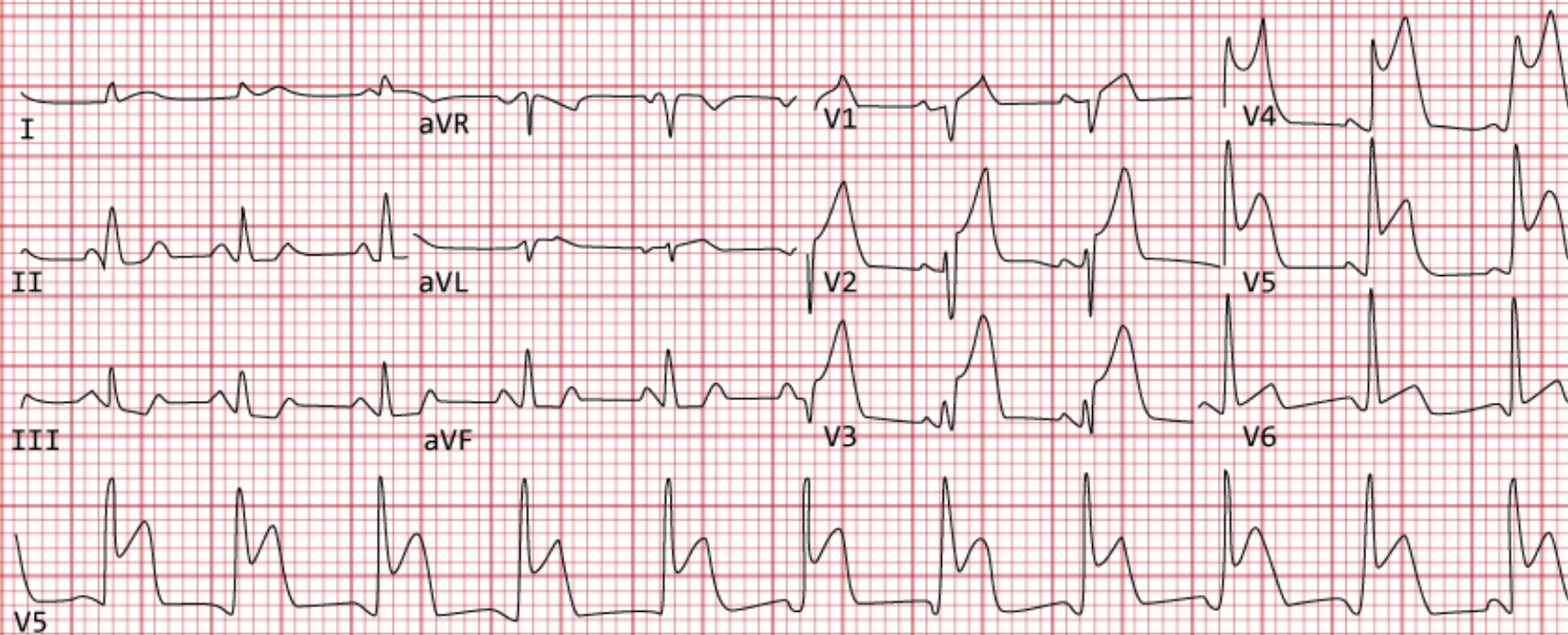
AMI

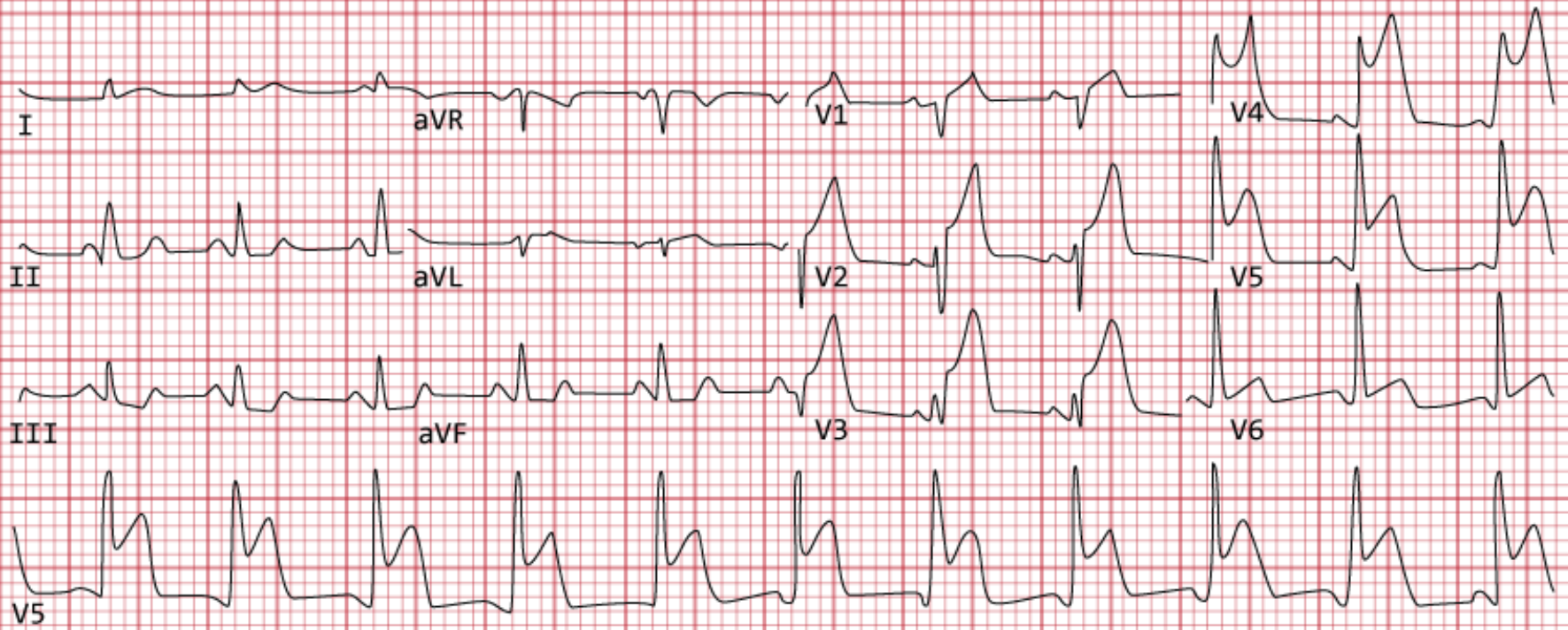
EXTENSIVE



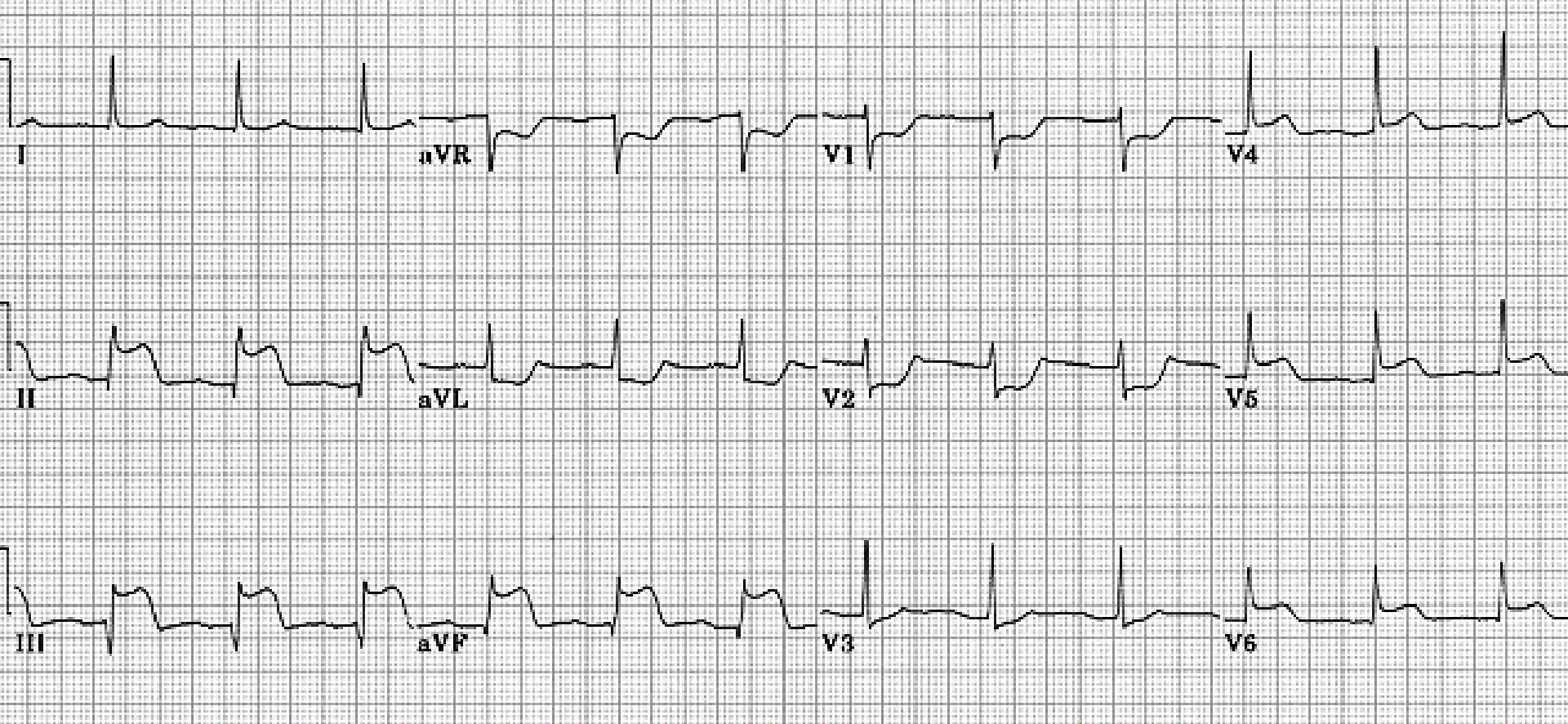


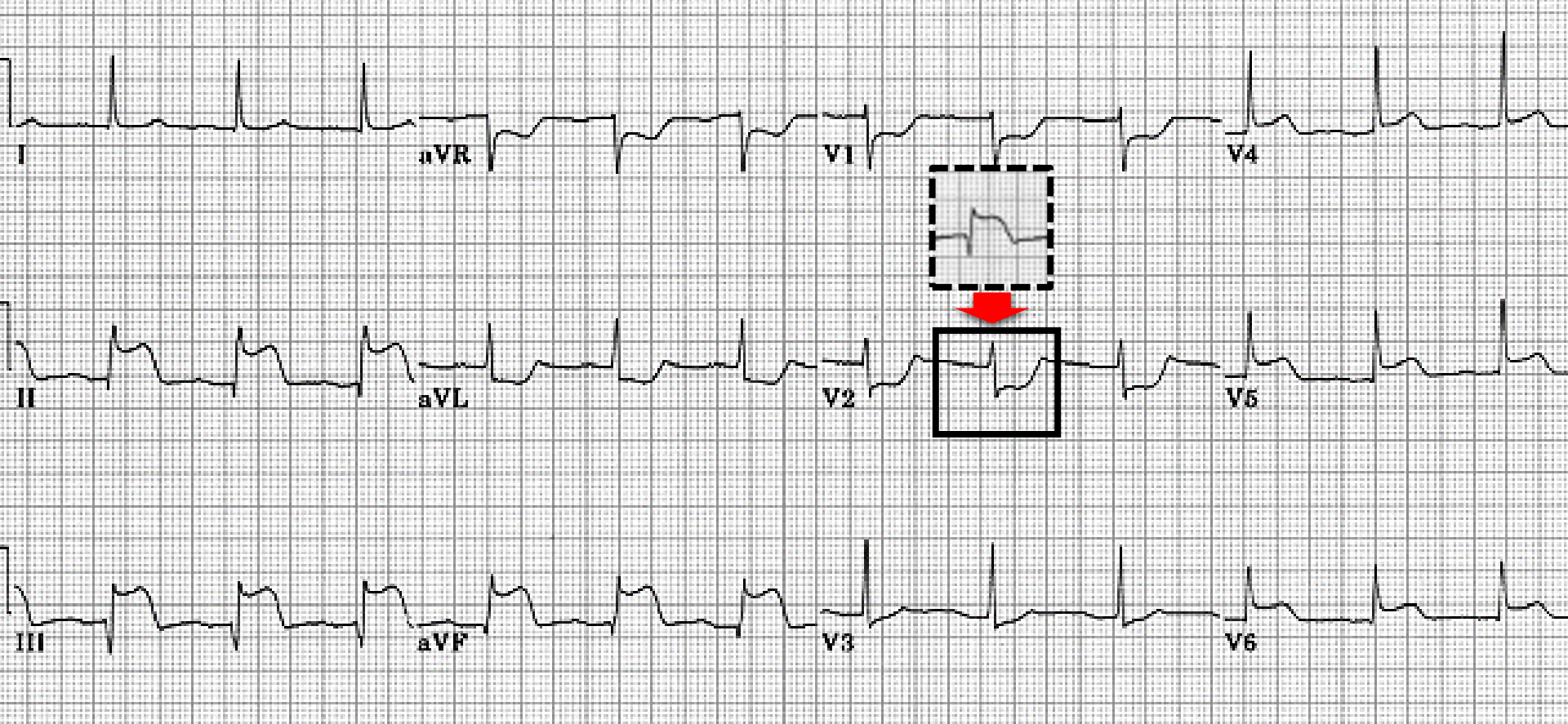
Inferior wall AMI





AMI (Anterior)





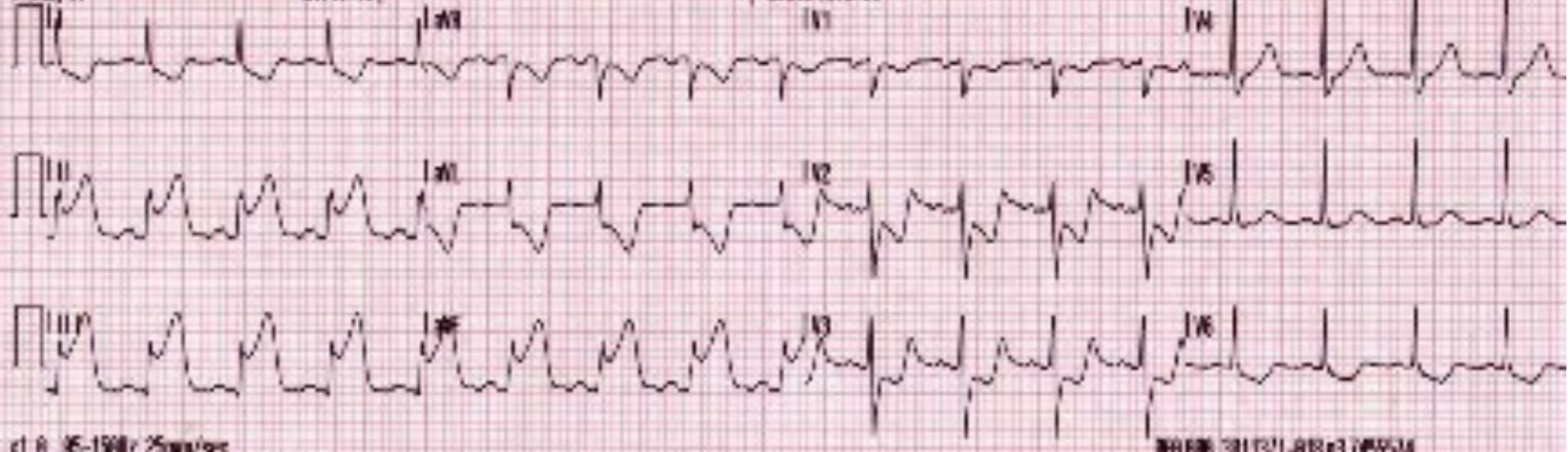
**MI (Posterior PLUS
Inferior wall)**

Name:
ID
Age: 43
12-Lead ECG
6/1 May 67

HR 100bpm
PR 0.140s
QT 0.371s
P-QRS-T axis
21:40:49

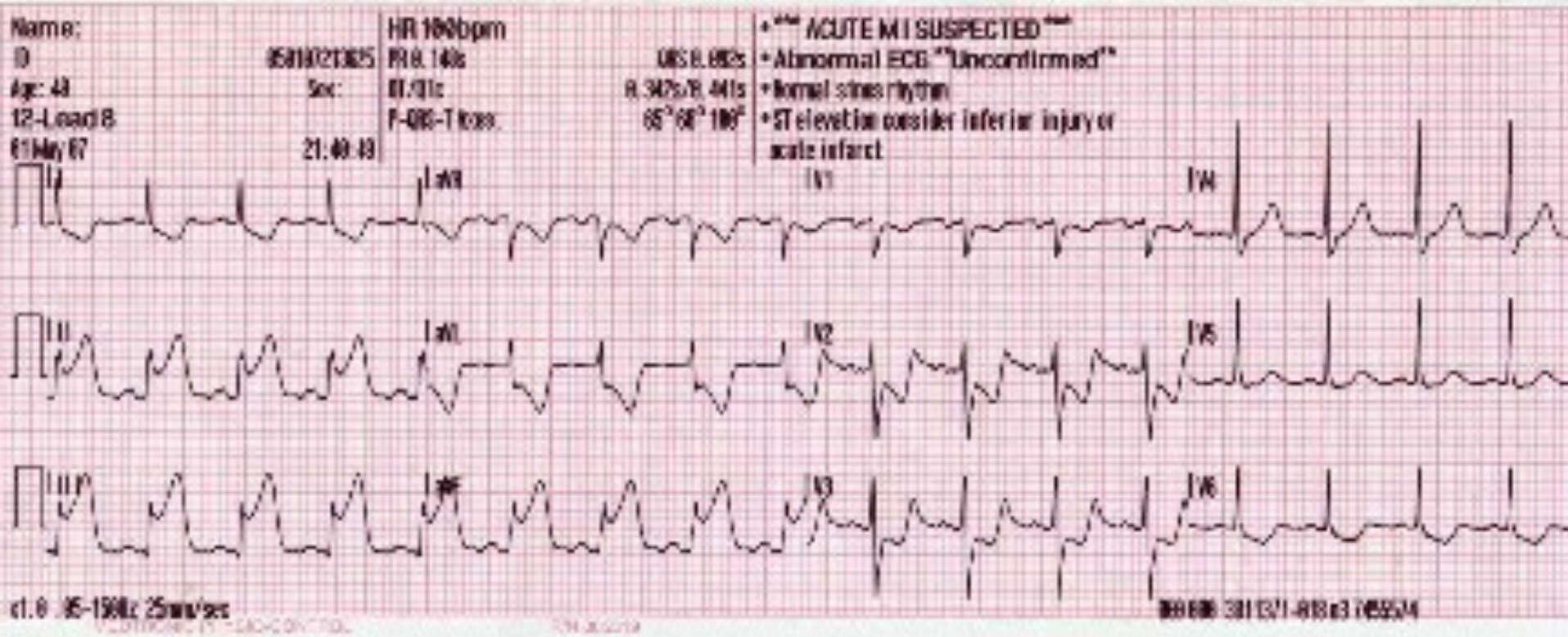
QRS 0.082s
R 3425/8, 441s
65° 68° 100°

• **ACUTE MI SUSPECTED**
• Abnormal ECG "Unconfirmed"
• Normal sinus rhythm
• ST elevation consider inferior injury or acute infarct

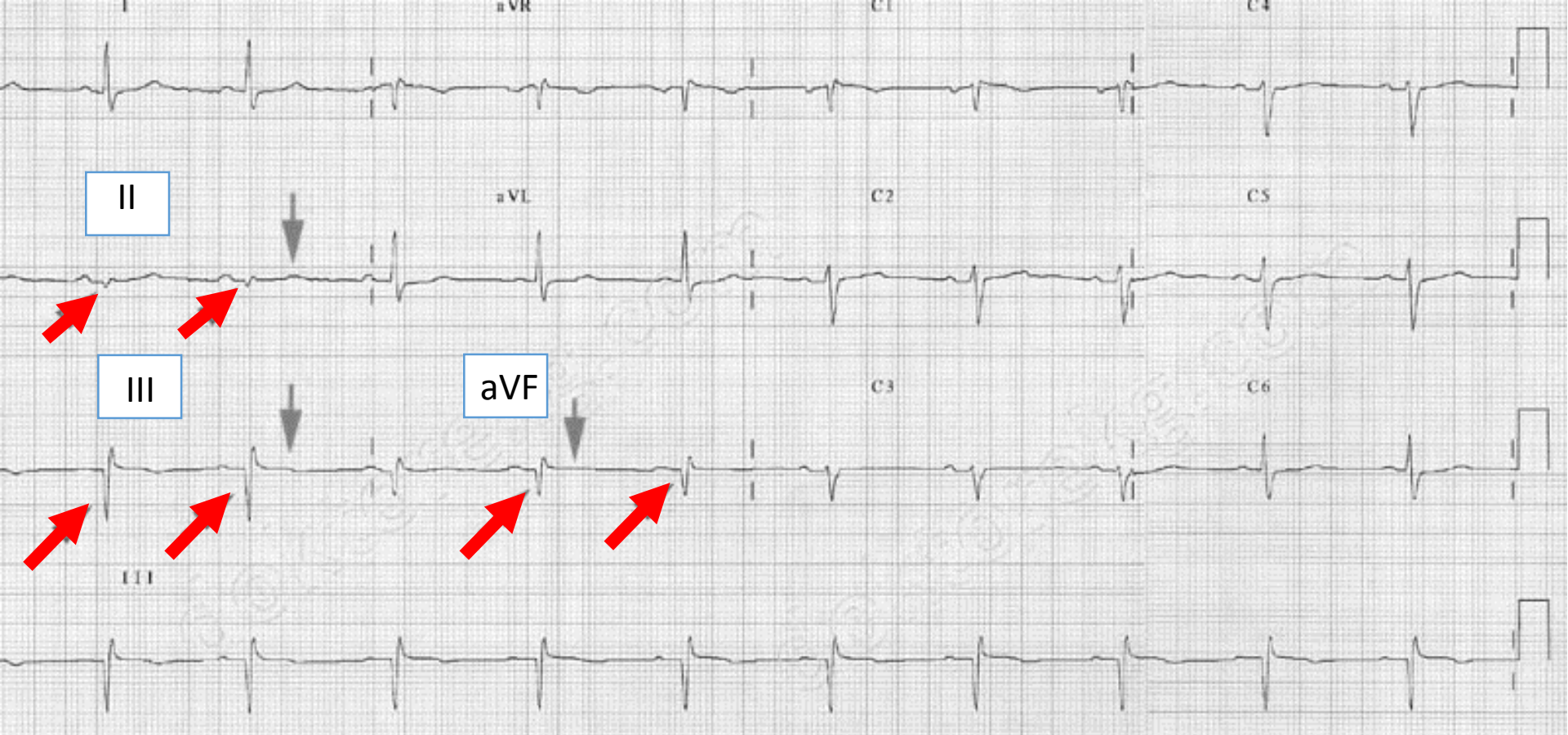


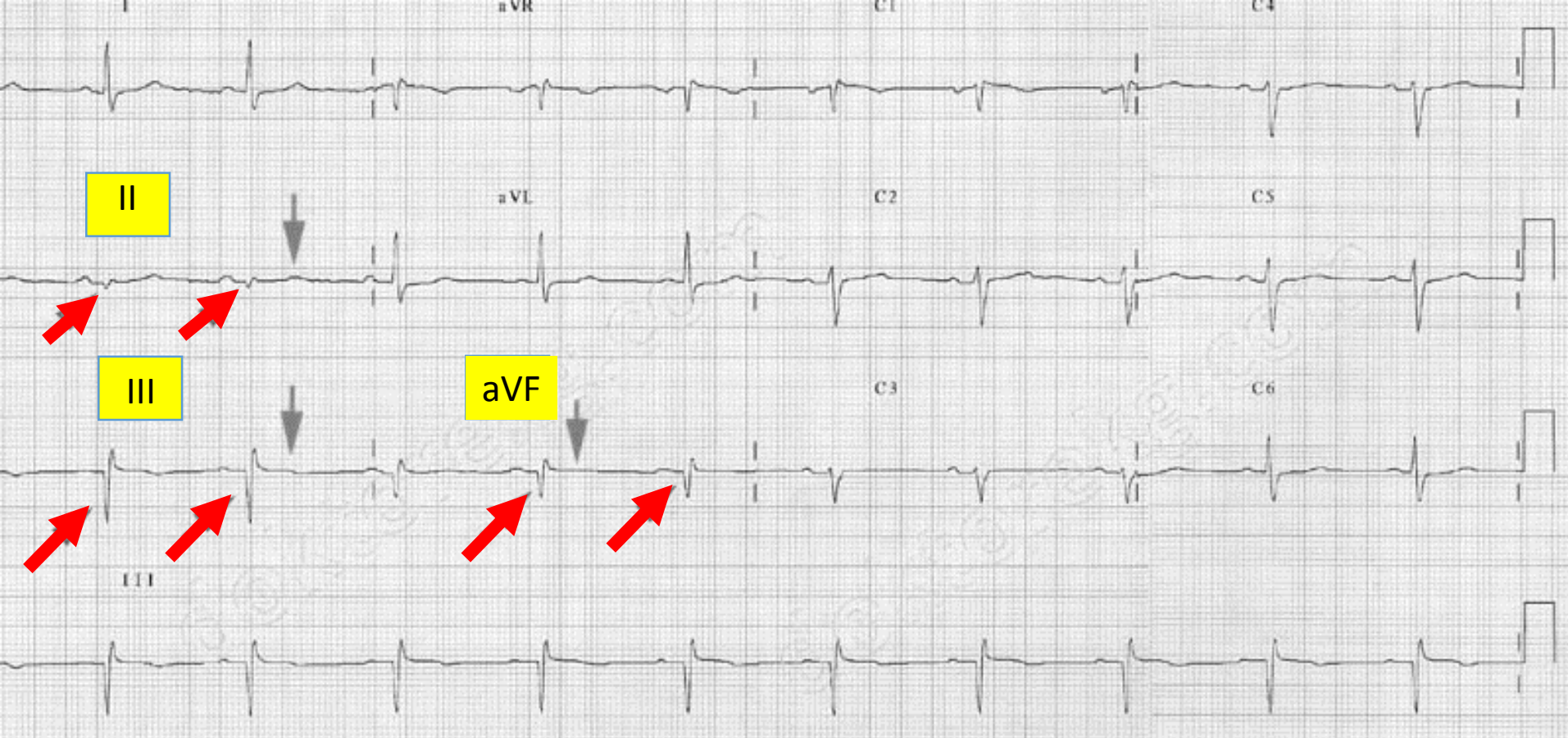
cl.0 05-1500x 25mm/sec

00000 301021-81003 705524



MI (Inferior wall)





Old MI

Other ECG Abnormalities

Level I



Dr. Tarek Abdelhamid M.D.

تحذير هام

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هذا الموقع هم تحت حماية قانون الملكية الفكرية**

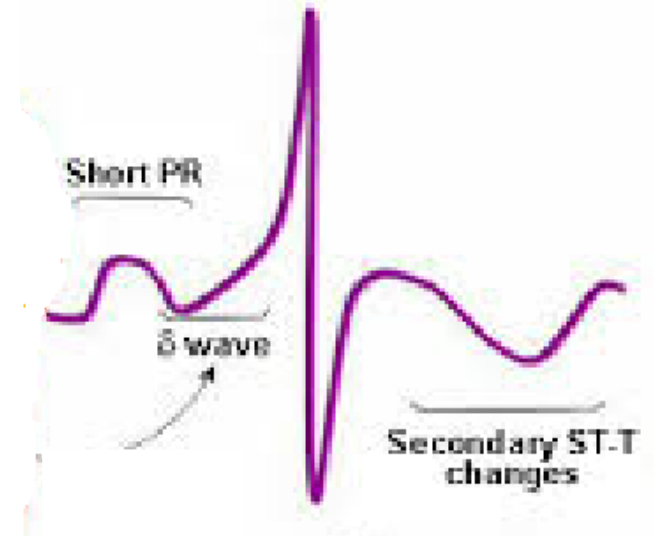
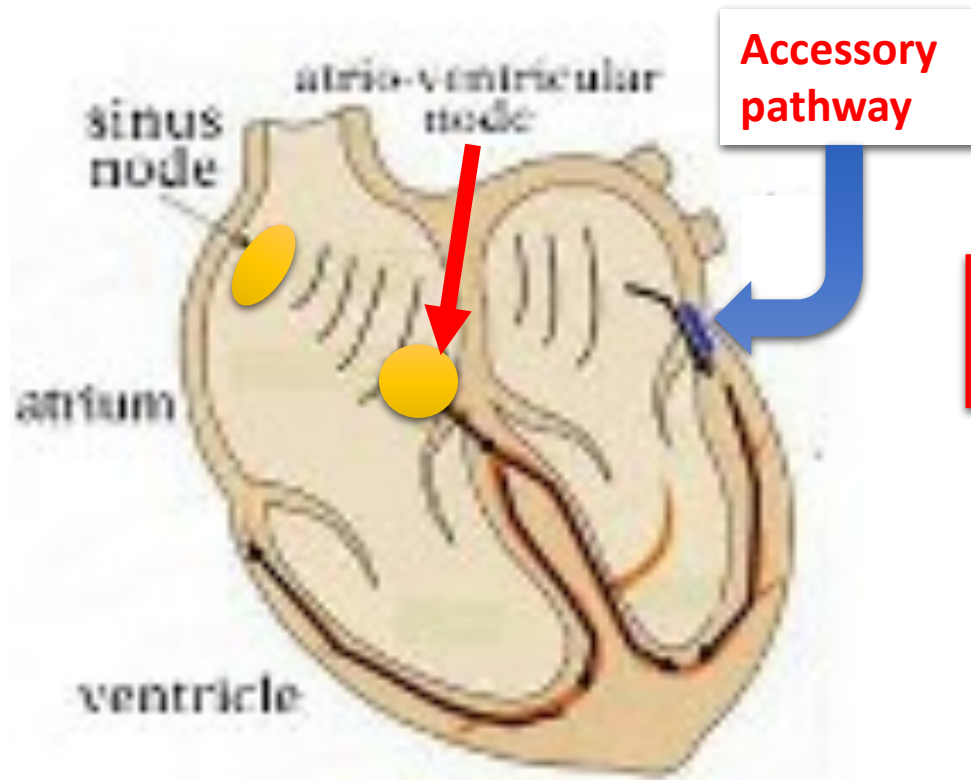
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حقوق الملكية الفكرية. و إستخدام الفيديوهات و المادة العلمية المذكورة مكفول
فقط لشخص واحد فقط و لأخذ تصريح إستخدام لأكثر من شخص برجاء
الإتصال بالدكتور طارق عبد الحميد



Other ECG Abnormalities

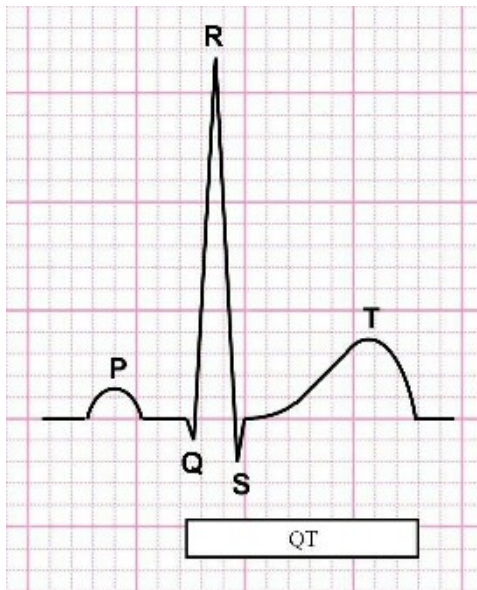


Wolff-Parkinson-White Syndrome WPWS

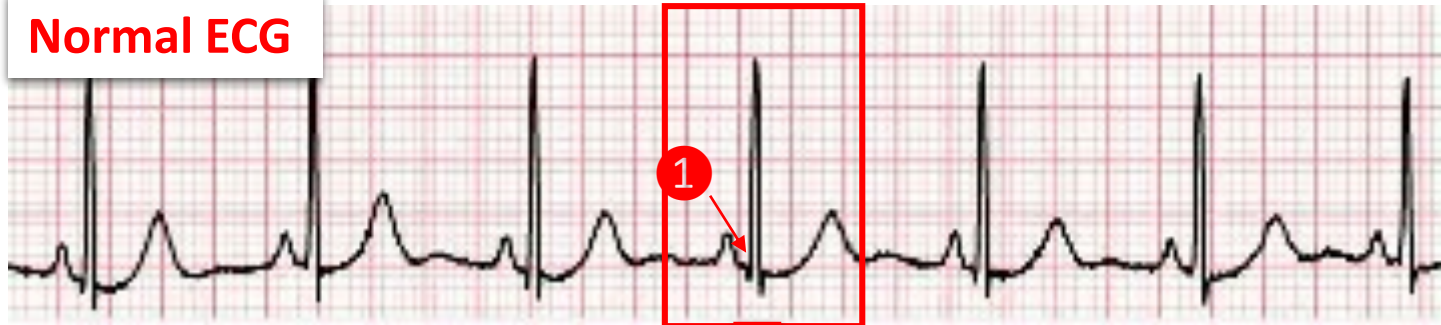


WPWS is associated with short PR interval and slurred initial segment of the QRS.

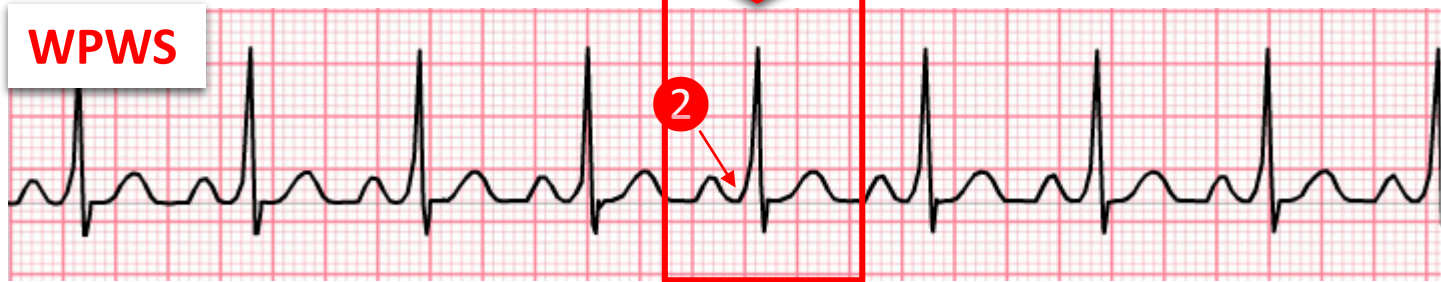


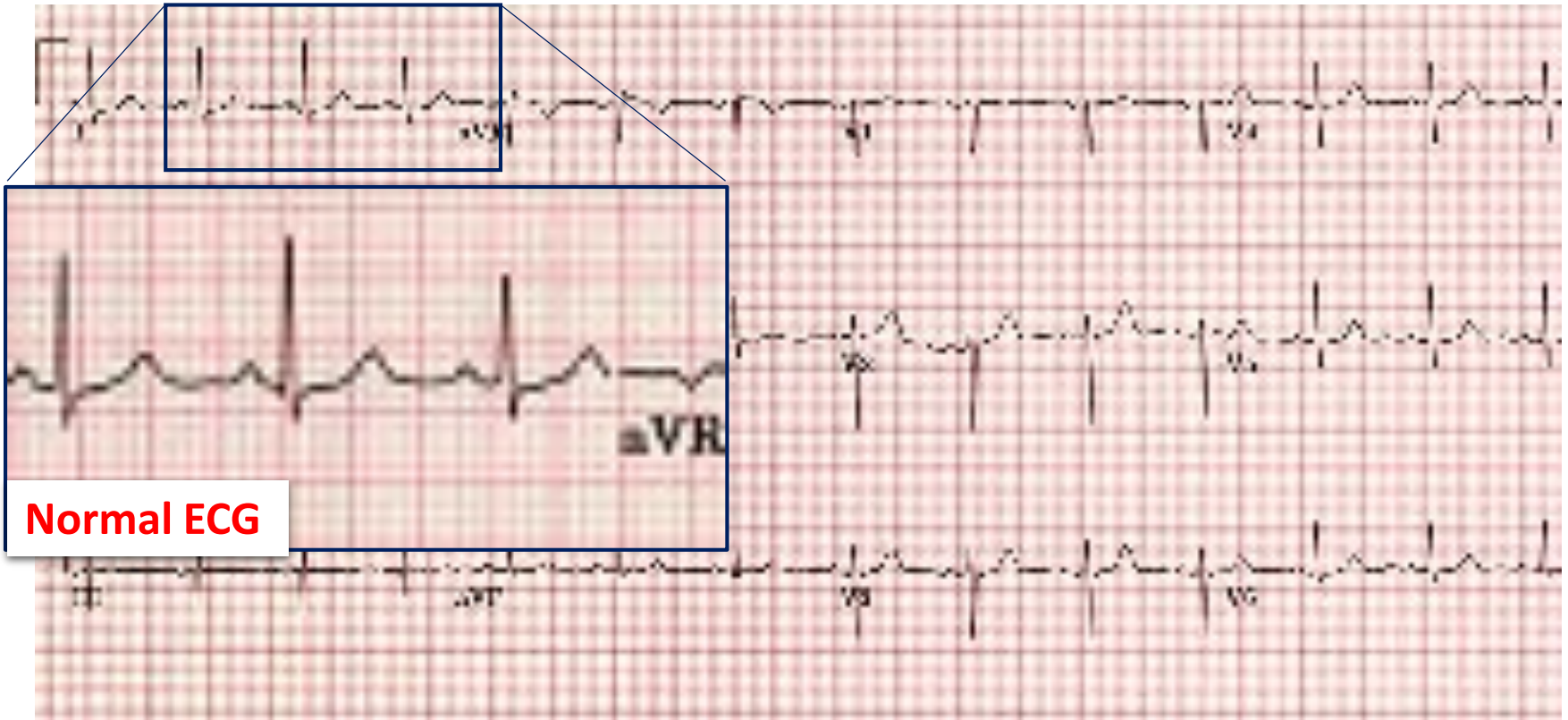


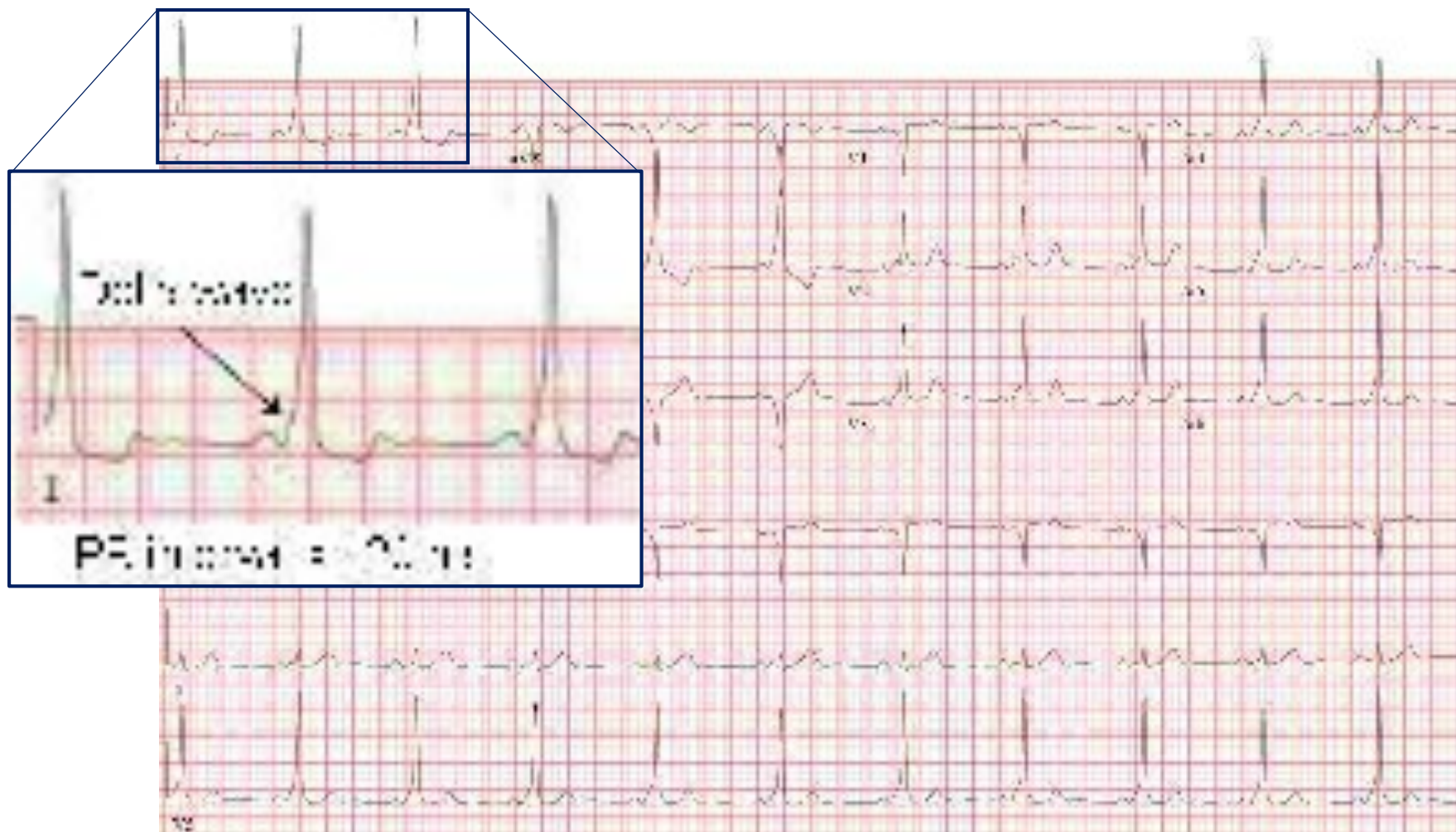
Normal ECG

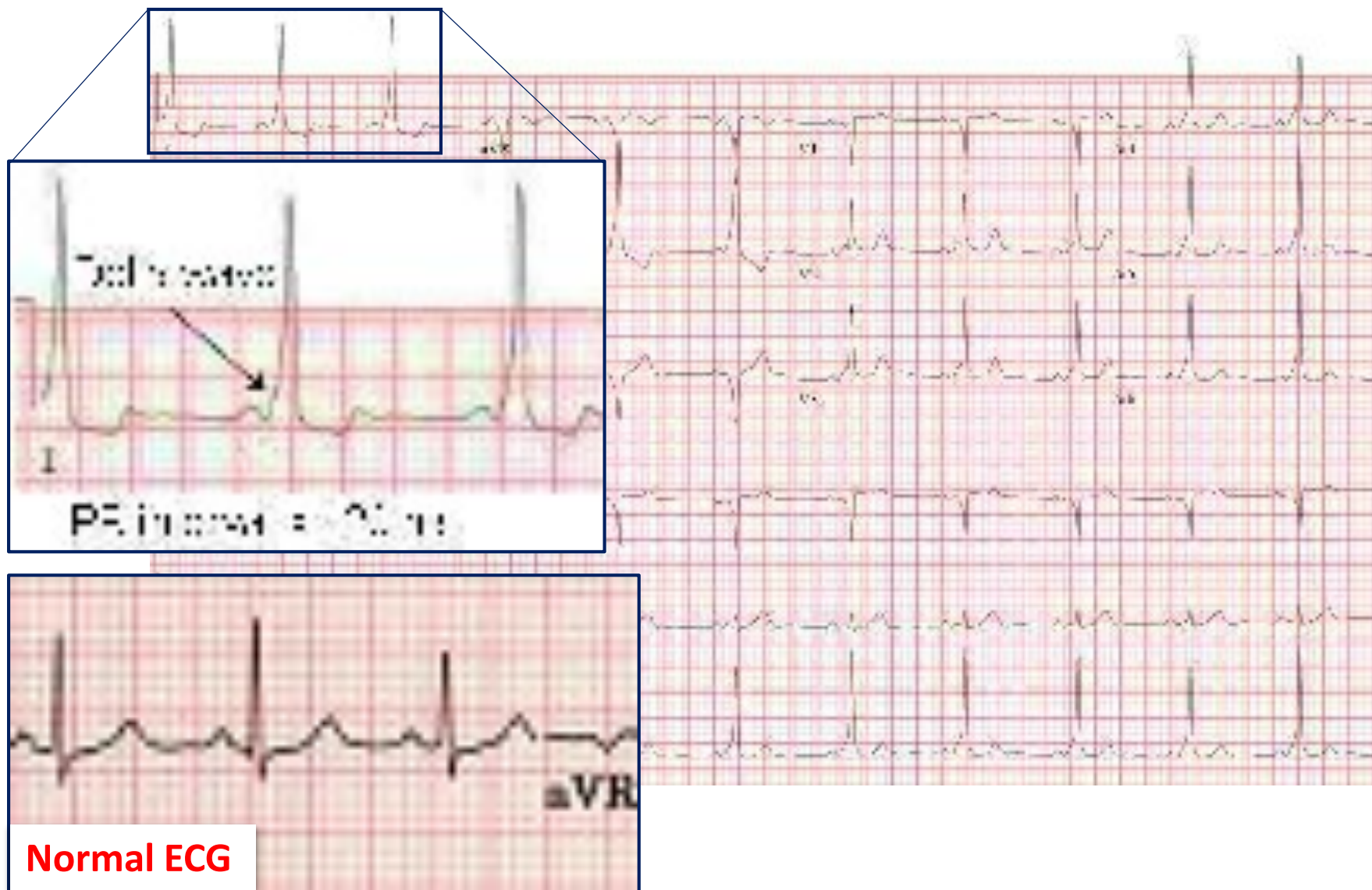


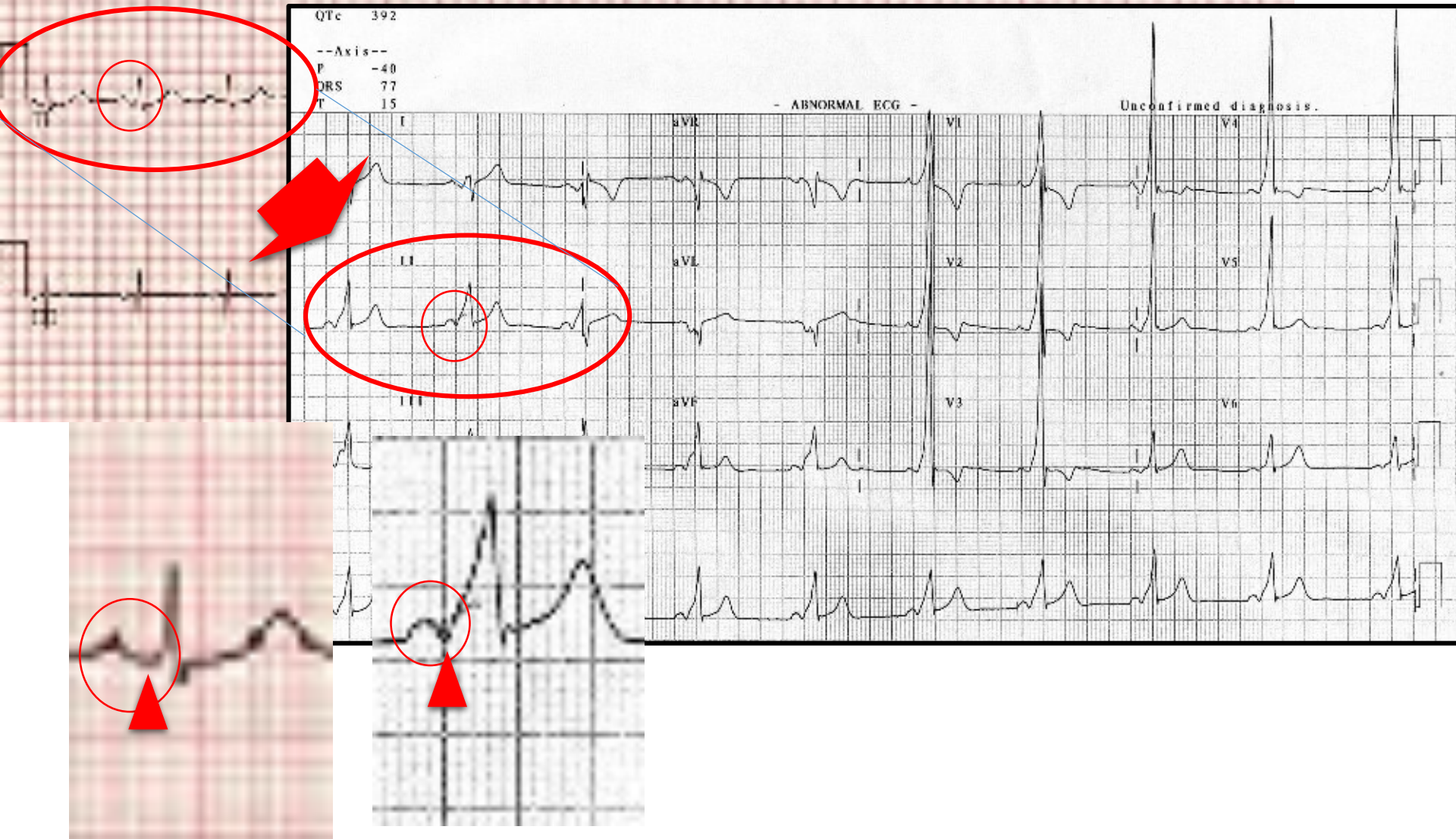
WPWS



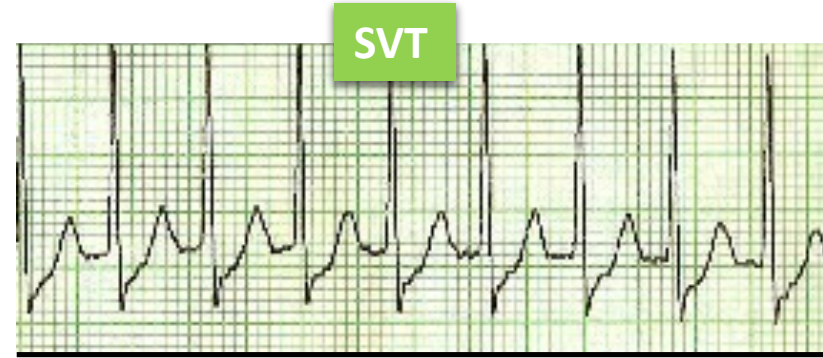
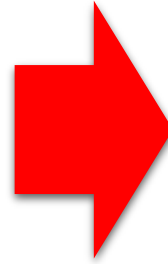
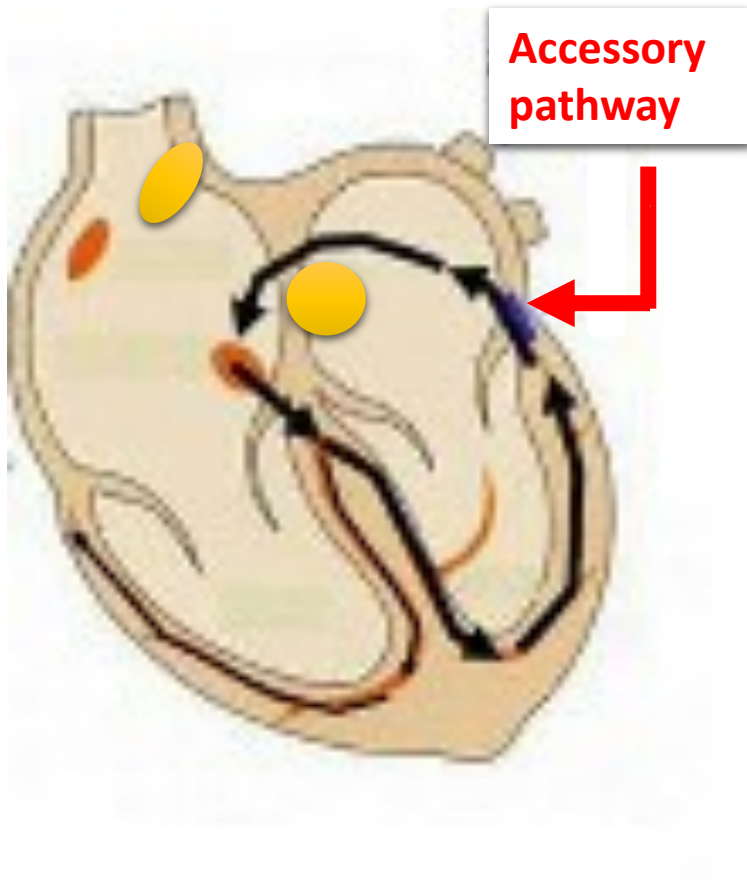




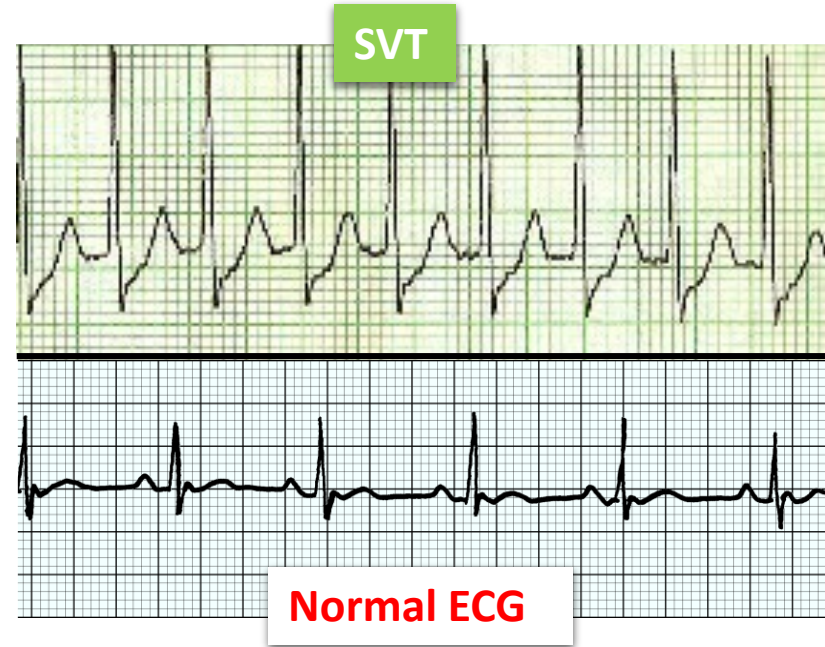
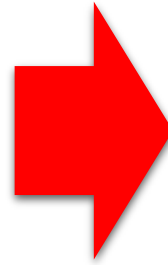
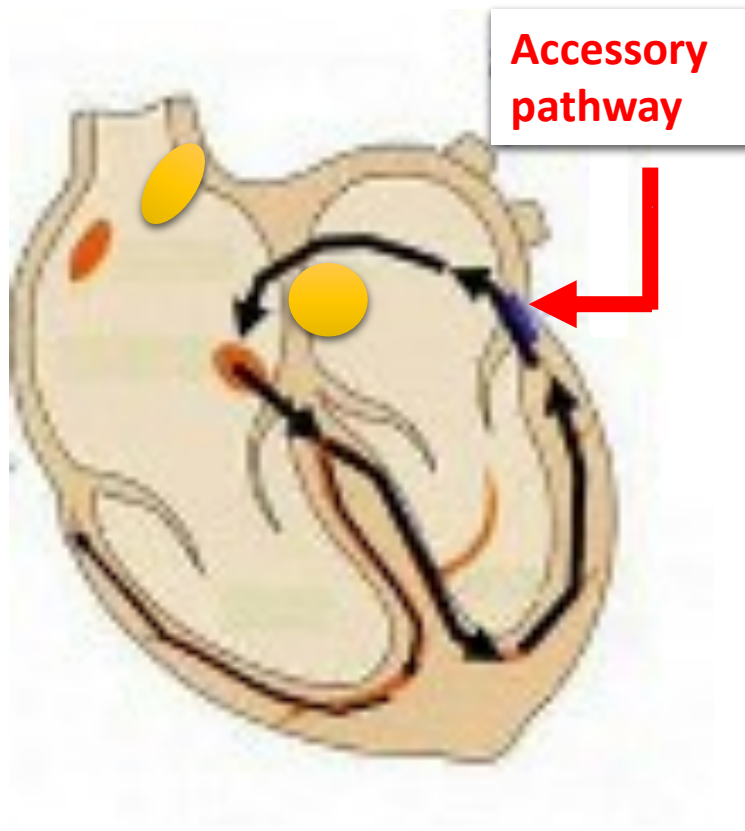




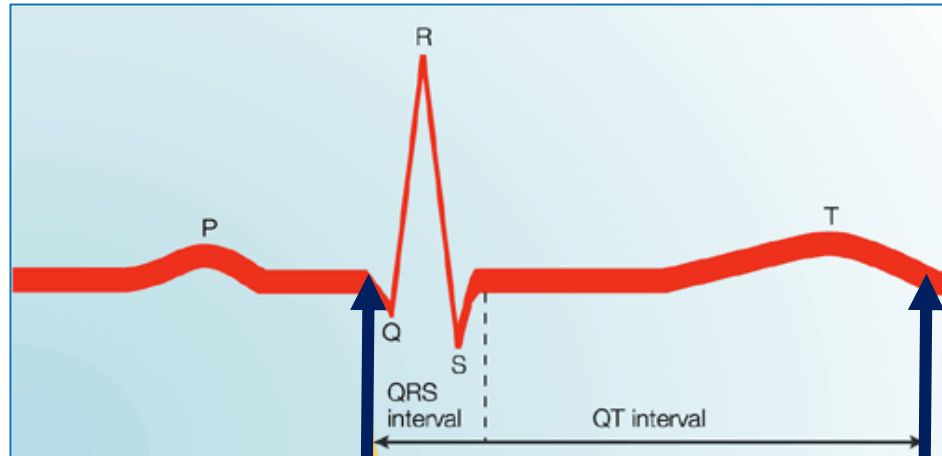
Wolff-Parkinson-White Syndrome **WPWS**



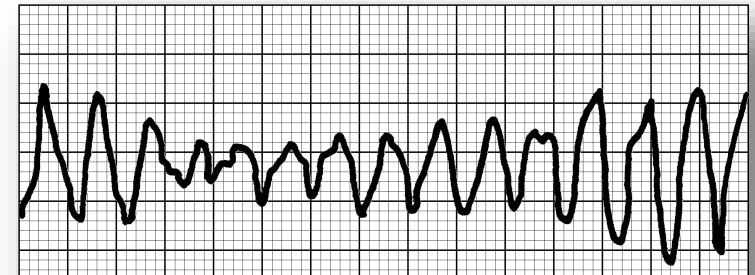
Wolff-Parkinson-White Syndrome **WPWS**



Long QT syndrome



The QT interval represents the duration of electrical systole i.e. the whole cycle of depolarization followed by repolarization.



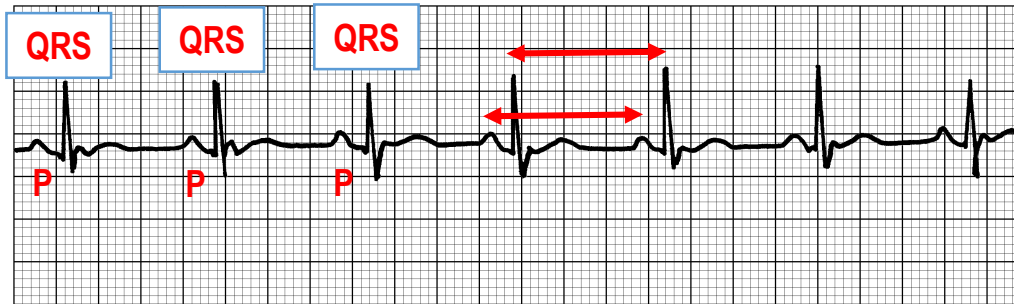
"Torsade de pointes"

- ① **Remove** the underlying causes
- ② **Stop** the medications that prolong the QT interval
- ③ **Other** measures may include
Magnesium infusion
DC shock
Beta blockers

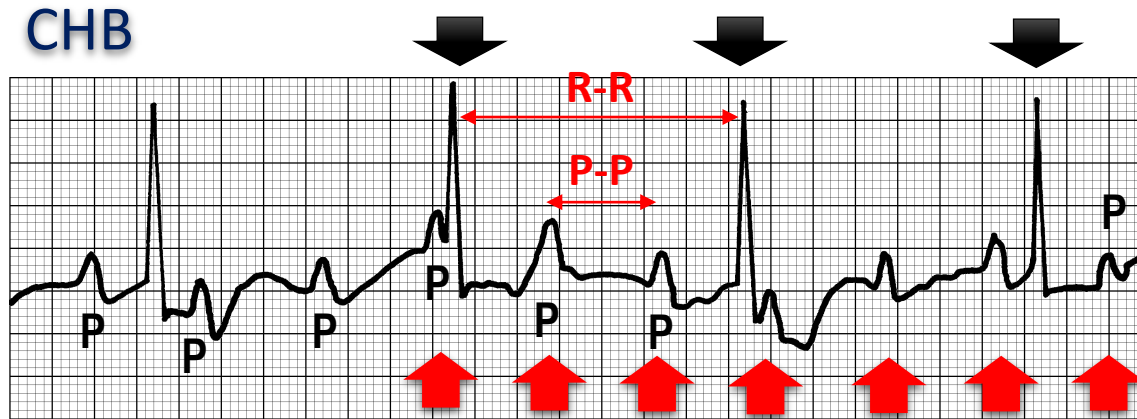
Antiarrhythmic drugs (especially **class I A** e.g. quinidine, procainamide, and disopyramide)
Brain injuries (Subarachnoid hemorrhage)
Cardiac diseases (e.g. ischemia, myocarditis, and severe bradycardia)
Drugs (e.g. tricyclic antidepressants)
Electrolyte imbalance (e.g. hypocalcemia and hypomagnesaemia)

Atrio ventricular dissociation

Normal



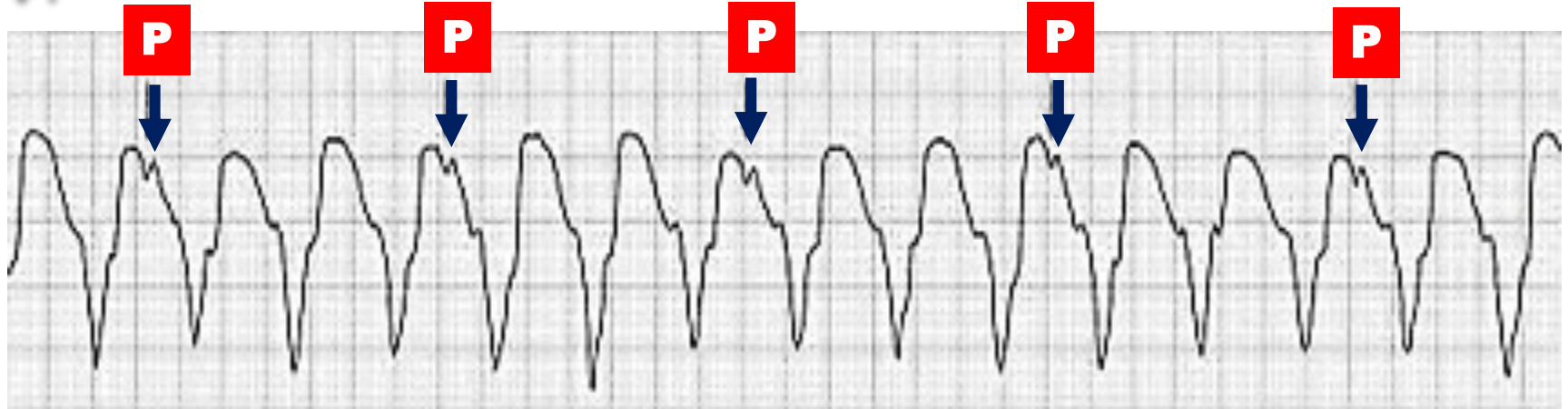
Atrio ventricular dissociation



P-P intervals are different from R-R intervals

Atrio ventricular dissociation

VT



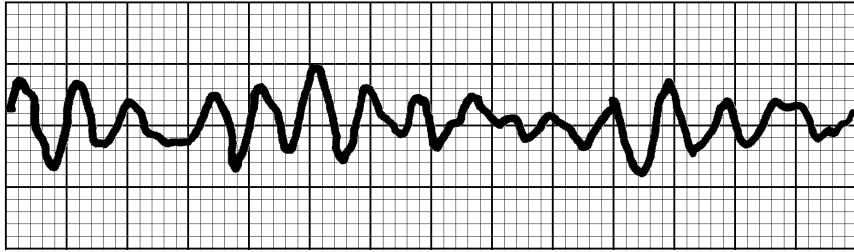
Cardiac Arrest



**Heart
Attack**

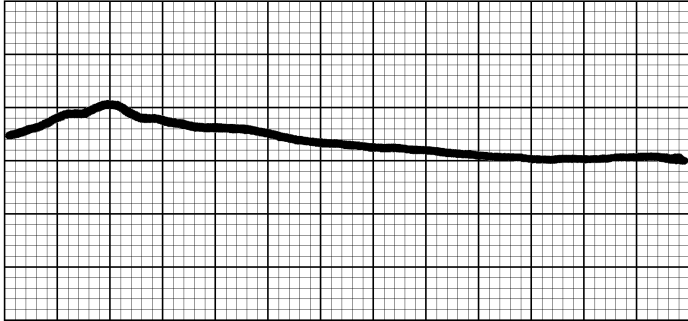
Cardiac Arrest

① Ventricular Fibrillation



Cardiac Arrest

② Asystole

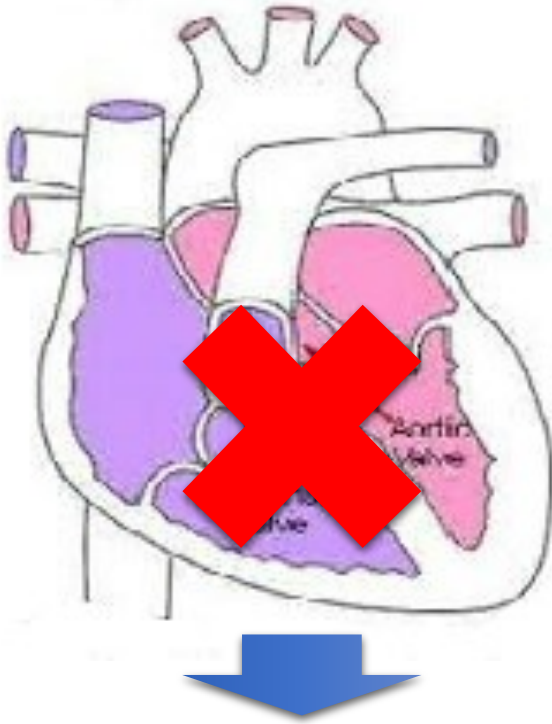


CPR



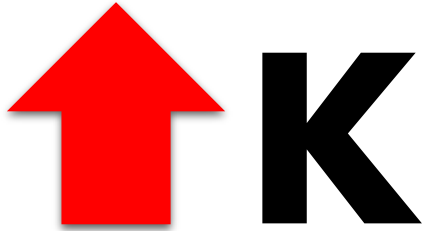
Cardiac Arrest

③ Electro mechanical dissociation

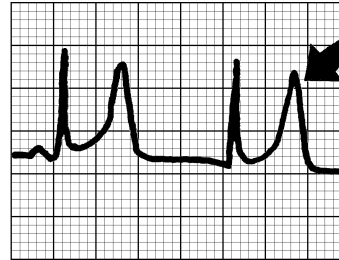


No mechanical contraction

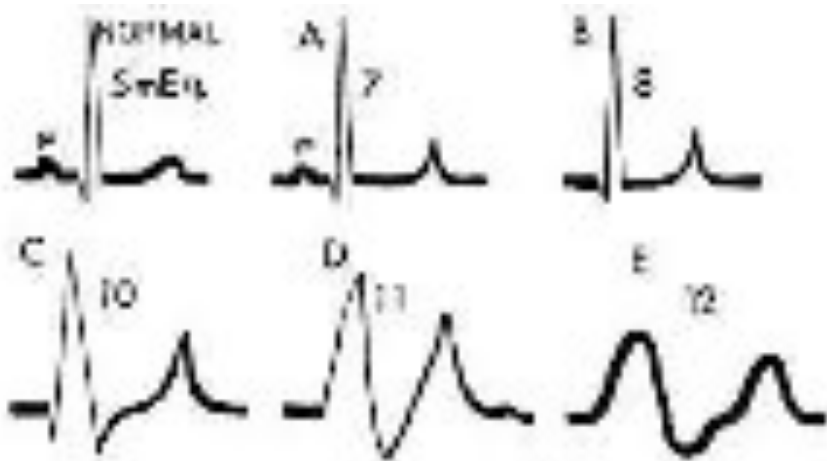
Electrolyte disturbances



- ① **Tall peaked T waves**
- ② **Low P waves**
- ③ **Wide QRS complexes**



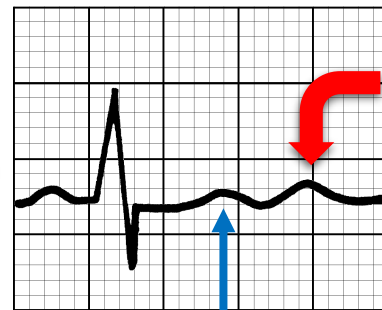
Tall peaked T waves



Electrolyte disturbances

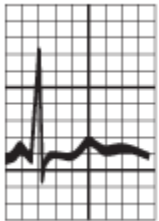


**Prominent
U waves**

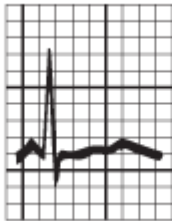


Flat T wave

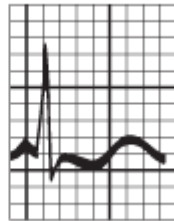
U wave



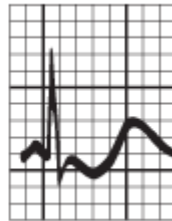
Normal



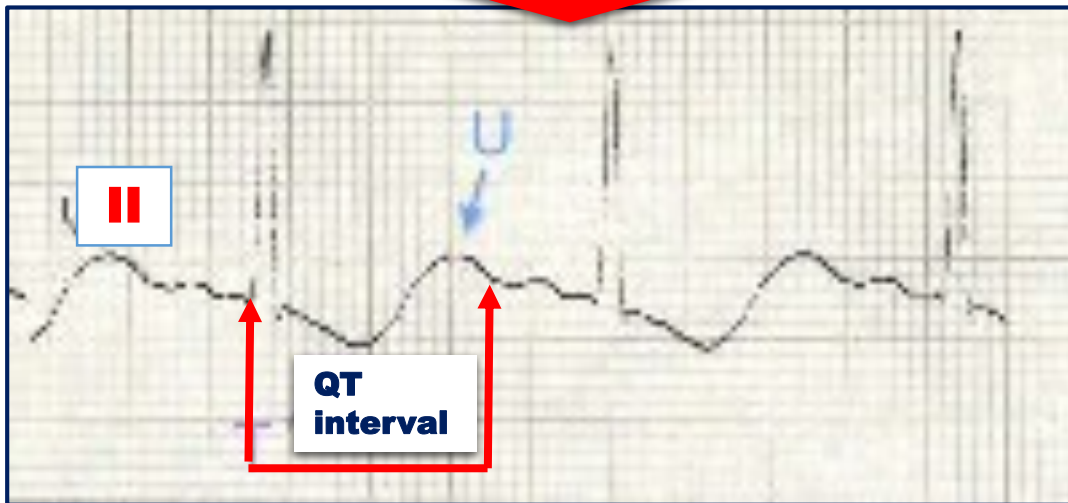
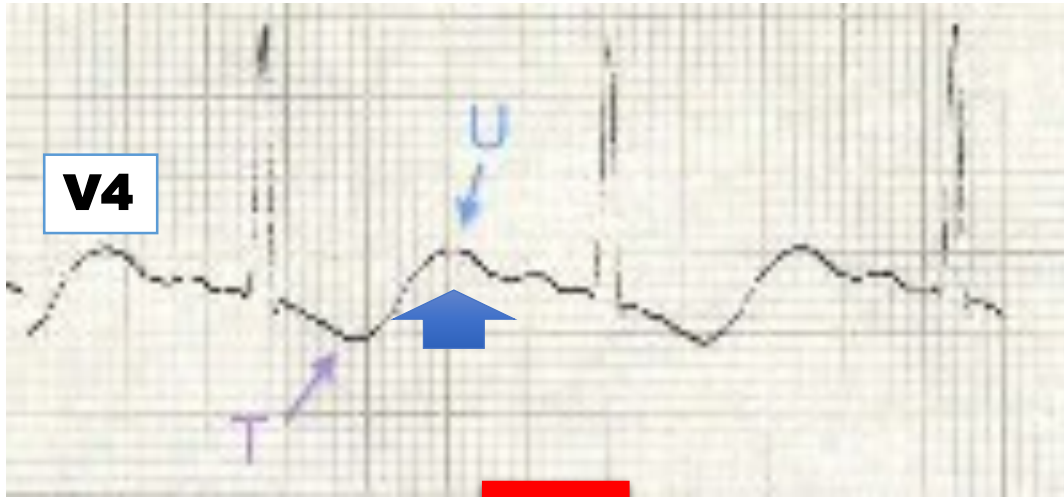
Flat T



Prominent U waves



Note

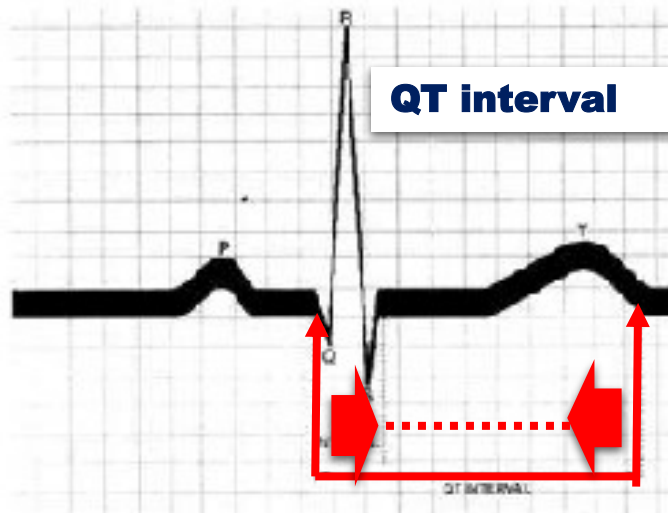


False increase in QT interval

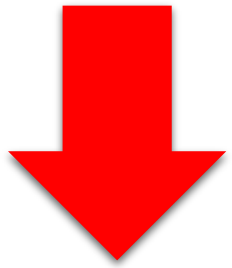
Electrolyte disturbances



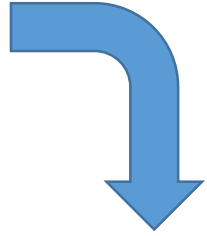
Short QT interval



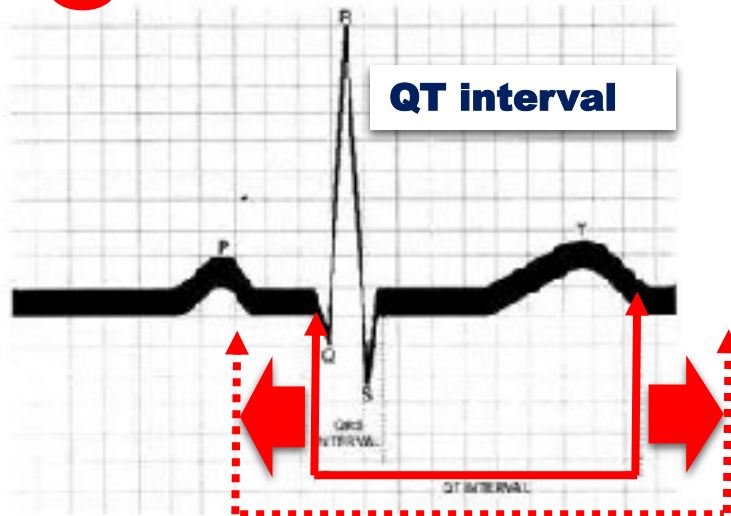
Electrolyte disturbances



Ca



Long QT interval



Tall +ve R wave in V1



Causes of tall +ve R wave in V1



Causes of tall +ve R wave in V1

- ① **RVH**
- ② **Posterior Wall-AMI**
- ③ **WPWS**
- ④ **HOCM**
- ⑤ **Normal Variant**